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## **Women Scientists and Managers in Agricultural Research in the Philippines**

Edwin G. Brush  
Deborah Merrill-Sands  
Dely P. Gapasin  
Virginia L. Mabesa

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# **Women Scientists and Managers in Agricultural Research in the Philippines**

Edwin G. Brush  
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*April 1995*

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## **FOREWORD**

Over the past decade, the number of women working as scientists and managers in agricultural research has increased markedly in both industrialized and developing countries. The integration of women into research organizations which have traditionally been staffed largely by men poses challenges for women who are building scientific careers as well as for their employers who are responding to demographic shifts. Research managers need to learn how to maximize the advantages and cope with new challenges that arise from the new mix of people in the work force.

The Philippines, where the proportion of women professionals in agricultural research is among the highest in the world, offer insights that may benefit other countries likely to see an increasing participation of women in research. For example, in countries where there are large discrepancies between salaries in private and public sectors, men are apt to move into the private sector and women will constitute an increasingly large share of professionals in the public sector. Professional positions in government organizations and academe are attractive to women because of their stability, autonomy, security, benefits, and flexibility, and policies that minimize discrimination. However, even when women constitute a major segment of the work force, constraints to their career attainment may persist because of institutional and cultural barriers. Examples of the former are limits to training grants for women. Cultural constraints include gender stereotypes about appropriate roles for men and women. Reduced attainment due to institutional or cultural constraints indicates suboptimal use of professional resources in an organization.

A crucial role of managers is to stimulate attainment among all staff in order to improve resource utilization. The experiences from the Philippines provide insights on policies and practices that can assist with incorporating women into research organizations and can foster career attainment. Examples include hiring couples in certain circumstances, eliminating barriers to the training of women, enhancing the role of teamwork, and using objective criteria to evaluate performance.

This report offers a systematic investigation of the entry, retention, and achievement of women professionals in agricultural science. The study, from a country with many women in science, may serve to inform organizations in countries where women's participation is an emerging issue about lessons in human resource management. Thus, we hope it will benefit research organizations generally. It may further studies elsewhere. By itself or in the company of others, it aspires to provide agricultural research managers and scientists worldwide, men and women alike, with insights that can foster good management practices and, thereby, to strengthen agricultural research.

We appreciate the financial contribution of the Gender Program of the Consultative Group for International Agricultural Research to support this study. However, above all we want to thank our colleagues in the Philippines whose enthusiasm and collaboration made the study possible and successful.

Christian Bonte-Friedheim  
Director General

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## **ABSTRACT**

This case study investigates the entry, retention, and achievement of women in agricultural science in the Philippines. It is intended to help research managers and their organizations in developing countries meet the challenges of changing work-force characteristics. It was carried out in four public-sector institutes with a total of almost 300 scientists, 54% of whom are women. The study used survey data, interviews and discussions with 100 staff, and records from two universities. Women are replacing men who have left the public sector for career opportunities in the private sector. Family responsibilities are an important factor leading to retention of women in public-sector jobs, which offer stability, flexibility, and supportive policies. Although women constitute a majority of the workforce, they are underrepresented in top-level positions. Seniority and research output did not explain the discrepancy since men and women have comparable length-of-service and publication records. Data suggest that women's careers are affected more than men's by their status in dual-career families. Women cited delays in training, relocation to follow husbands, and lack of mobility as career constraints. Cultural stereotypes of men's and women's roles within the household continue to color and affect working relationships and appear to limit women's opportunities for advancement into senior positions. We are likely to see increasing participation of women in research organizations in developing countries. Constraints to women's career attainment may persist primarily due to cultural barriers. The study discusses management practices from the Philippines that can assist the effective incorporation of women into a scientific work force.

## **ABREGE**

La présente étude de cas porte sur la participation des femmes à la recherche agricole aux Philippines, qu'elle examine des points de vue du recrutement, de la durée des emplois et des accomplissements. L'objectif recherché est d'aider les gestionnaires des organisations de recherche de pays en développement à répondre aux défis présentés par une force de travail en pleine évolution. L'étude porte sur quatre instituts du secteur public comptant au total presque 300 chercheurs dont 54 % sont des femmes. Elle se base sur des résultats d'enquêtes, sur des entrevues et des discussions avec une centaine de personnes, et sur une consultation de dossiers dans deux universités. Il en ressort que les femmes reprennent souvent des postes d'hommes ayant quitté le secteur public pour faire carrière dans le secteur privé. La tendance des femmes à demeurer dans le secteur public s'explique par leurs responsabilités familiales : elles y trouvent en effet des conditions stables, des horaires flexibles et un appui politique. Cependant, tout en constituant une majorité, les femmes n'en sont pas moins sous-représentées dans les échelons supérieurs — cette divergence ne peut être liée ni à l'ancienneté, ni à la productivité scientifique, car hommes et femmes poursuivent des carrières de durée comparable et produisent des nombres équivalents de publications scientifiques. Les données recueillies font ressortir que l'appartenance à un couple dont les deux membres travaillent influence plus fortement la vie professionnelle des femmes que celle des hommes. Les femmes mentionnent comme obstacles rencontrés, les formations différées, les déménagements pour accompagner un époux, et le manque de possibilités de se déplacer librement. En outre, les stéréotypes relatifs aux rôles assignés aux hommes et aux femmes au sein du foyer continuent à influencer les perceptions et les relations sur le

lieu du travail, limitant souvent, de ce fait, les chances des femmes à accéder à des postes supérieurs. La proportion des femmes travaillant dans les organisations de recherche du monde en développement va probablement augmenter à un rythme croissant. Les principales entraves dans la carrière des femmes sont des barrières culturelles. Cette étude analyse des pratiques de gestion en vigueur aux Philippines qui peuvent promouvoir l'intégration effective des femmes dans le corps des chercheurs scientifiques.

## RESUMEN

El presente estudio de caso investiga el acceso, la permanencia y los logros de la mujer en la ciencia agrícola en Las Filipinas. Este tiene por objeto ayudar a los investigadores y sus organizaciones en países en desarrollo, a enfrentar los retos de las características cambiantes de la fuerza de trabajo. Se llevó a cabo en cuatro institutos del sector público con un total de aproximadamente 300 científicos, de los cuales el 54% son mujeres. El estudio utilizó encuestas, entrevistas y discusiones con 100 empleados y los registros de dos universidades. Las mujeres vienen reemplazando a los hombres que han dejado el sector público por oportunidades de carrera en el sector privado. Las responsabilidades familiares son un factor importante que conduce a la retención de las mujeres dentro del sector público en posiciones que ofrecen estabilidad, flexibilidad y políticas de apoyo. Aunque las mujeres constituyen una mayoría, ellas no están representadas adecuadamente en las posiciones de alto nivel. La antigüedad y los resultados de la investigación no explicaron esta discrepancia, ya que hombres y mujeres cuentan con tiempo de servicio y récord de publicaciones comparables. La información sugiere que las carreras de las mujeres son más afectadas que las de los hombres por su estatus dentro de las familias con dualidad de carreras. Las mujeres citaron como obstáculos a su carrera, retrasos en capacitación, reubicación para acompañar a sus esposos, y falta de movilidad. Los estereotipos culturales sobre los roles de los hombres y de las mujeres dentro del hogar continúan coloreando y afectando las relaciones de trabajo, y parecen limitar las oportunidades de progreso de las mujeres hacia posiciones superiores. Probablemente observaremos una mayor participación de las mujeres en organizaciones de investigación en países en desarrollo. Las limitaciones a los logros en las carreras de las mujeres podrían persistir, principalmente debido a barreras culturales. El estudio discute las prácticas gerenciales en Las Filipinas que pueden ayudar a la efectiva incorporación de la mujer en una fuerza de trabajo científica.

## ACRONYMS

ARIS	Agricultural Researcher Information System (developed by ISNAR)
BIOTECH	National Institute of Biotechnology and Applied Microbiology (at UPLB)
CARP	Council for Agricultural Research Policy
CGIAR	Consultative Group for International Agricultural Research
EC	European Community
INFORM	Information for Agricultural Research Managers (developed by ISNAR)
IPB	Institute of Plant Breeding (at UPLB)
ISNAR	International Service for National Agricultural Research
NARRDN	National Agriculture and Resources Research and Development Network
NARS	national agricultural research system
NARDS	National Agricultural Research and Development System
NEDA	National Economic Development Authority
NPGR	National Plant Genetics Resources Laboratory (at UPLB)
PCAMRD	Philippine Council for Aquatic and Marine Resources Research and Development
PCARRD	Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development
PHILRICE	Philippine Rice Research Institute
PRCRTC	Philippine Root Crop Research and Training Center (at VISCA)
UNESCO	United Nations Education, Scientific, and Cultural Organization
UPLB	University of the Philippines at Los Baños
USAID	United States Agency for International Development
VISCA	Visayas State College of Agriculture

## EXECUTIVE SUMMARY

The participation of women in science is increasing worldwide. In developing countries, particularly in Asia, many women have entered agricultural science. In the Philippines, women comprise approximately 50% of researchers in public-sector agricultural research. This study investigates the entry, retention, and achievement of women in agricultural science in the Philippines. It is intended to help readers understand some of the issues raised by current human resource trends in research organizations. The authors hope that it will enable research managers and organizations in developing countries to seize the opportunities and meet the challenges of changing and more diverse work forces.

The study was carried out in four public-sector research institutes with a total of almost 300 scientists, 54% of whom are women. It included a staff survey, in-depth discussions with about 100 scientists and managers, and analyses of personnel manuals, management reports, and degree awards from Philippine universities during 1970-1990.

### Entry

Several key factors help explain the high level of women scientists in the Philippine system: educational opportunities and an emphasis on science in the curriculum, economic and social incentives, the absence of gender stereotypes about science, the relatively lower status of science compared to other professions, and job access in government and universities. Women have been replacing men who have left the public sector for better salaries and career opportunities in the private sector and abroad. Women face little overt discrimination in the public sector, but significant obstacles remain in the private sector.

### Retention

The attrition of women scientists is low. In contrast to experiences in some industrialized countries, women do not resign upon having children. To the contrary, family responsibilities appear to be an important factor leading to retention in public-sector jobs, which offer stability, flexibility, and supportive policies. Other factors that contribute to the low turnover of women include maternity leave policies, practices that involve flexible schedules, delegation, and teamwork. Staff who take time off from work to deal with family responsibilities are encouraged to make up work through overtime and work at home. Noninstitutional support includes extended families and domestic help. Despite strong social norms reinforcing women's primary responsibility for child rearing, institutional and outside factors enable the research organizations to maintain a stable and productive female work force.

### Achievement

Although women constitute the majority of the workforce, they appear to be underrepresented in senior scientific and management positions: there are twice as many men in senior positions and 10% of the men are managers compared to 3% of the women. Seniority and research output does not explain the discrepancy since men and women have comparable length-of-service and publication records. Though more women are found in

laboratory-oriented than in field-oriented disciplines, this orientation does not appear to affect promotion prospects. Nor do there seem to be any systematic differences between men and women in terms of geographic mobility. The time spent at field locations appears to be an effect of the institute's program thrusts and location, not of gender: in outlying institutes, where staff spend more time doing fieldwork than their counterparts in centrally located institutes, women do as much fieldwork as men. However, married women tend to concentrate more than men in central stations. Managers in outlying stations reported that hiring spouses contributes to their ability to fulfill recruitment targets; however, there they take care to place husbands and wives in separate units in order to improve their chances of success.

Women scientists publish at a rate equal to male counterparts. While women reported experiencing more work-family conflicts, family status does not seem to affect their research output. However, the data suggest that women's careers are affected more than men's by their status in families where husband and wife both have careers. A much higher percentage of women than men have professional spouses. Women in dual-career families cited delays in training, relocations to follow husbands, and lack of mobility to pursue opportunities as career constraints. Deferral by wives in career decisions reflects the Filipino social norm in which men are the primary "breadwinner."

### **Management Issues**

Staff absenteeism due to family situations is an issue for managers everywhere. Flexible hours and part-time employment are accepted in the Philippine system as informal practices to address work-scheduling problems. These practices involve enabling aspects: cross-training so that any task can be performed by more than one person, delegation to peers and assistants, an active sense of give and take, and teamwork to assure that tasks are covered.

In the study, gender did not appear to inhibit productive working relationships among peers. Although many still preferred and found it easier to work closely with colleagues of the same sex, they maintained effective relationships with colleagues of the opposite sex. Men and women spoke of the benefits of having a diverse staff in terms of complementary skills and approaches, research quality and organizational performance, working relationships, and the climate or ambiance of the workplace. However, norms of social behavior limit the degree of interaction between male and female colleagues outside the workplace. This circumscribes women's access to information and ideas, their opportunities to cultivate professional contacts, and their ability to wield influence through informal channels.

However, gender is an important variable affecting vertical relationships. While men in the study were willing to accept women as equal colleagues, they appeared less accepting of women in positions of power. Cultural stereotypes of men's dominant and women's subordinate decision-making roles within the household continue to color and affect working relationships and appear to limit women's opportunities for career advancement into senior positions.



## **Lessons**

The study suggests that we are likely to see increasing participation of women in public-sector research organizations in developing countries. Professional positions in government organizations and academe are attractive to women because of their stability, autonomy, security, benefits, and flexibility, and the policies that minimize discrimination. The Philippine case indicates, however, that even when women constitute a major segment of the work force, constraints to their career attainment may persist because of institutional and cultural barriers. Examples of the former are limits to training grants for women. Cultural constraints include gender stereotypes about appropriate roles for men and women, which affect the encouragement to women and provision of opportunities for promotion by managers as well as decisions by women themselves about investing in activities related to career attainment. Reduced attainment due to institutional or cultural constraints suggests suboptimal use of professional resources in an organization.

A crucial role of management is to stimulate attainment in all segments in order to improve efficient utilization of the work force. The experiences from the Philippines provide some insights on management policies and practices that can assist with the effective incorporation of women into the scientific work force and reduce the negative impact of conflicts with women's family responsibilities on performance and career attainment.



## 1. Introduction

Over the past decade, the number of women working as scientists and managers in agricultural research has increased markedly in both industrialized and developing countries. The integration of women into organizations that have traditionally been staffed largely by men poses challenges both for the women entering and trying to build their careers in these organizations and for their employers. The issues and opportunities that women scientists and their employers face have been discussed more extensively in industrialized countries than in developing countries (Brush and Rao 1991; Stolte-Heiskanen, 1991; Zuckerman, Cole and Bruer, 1991). This study seeks to examine these issues within the context of agricultural research organizations in developing countries.

Although the data are patchy, there is clear evidence of increasing participation of women in research and technology development around the world. For example, in the United States only 7% of the doctorates in science and engineering were awarded to women in the 1950s. Women's participation began to increase in the 1970s when 14% of the science and engineering doctoral degrees were awarded to women. By the late 1980s, women's share of doctoral degrees in science and engineering had increased to 25% (National Science Foundation 1991; Vetter 1987). With respect to employment, women's participation increased from 20% of all employed scientists in the United States in 1978 to 30% in 1988. Similar trends showing women's increasing participation in science can be seen in European and many Third World countries (Makubu 1991. Merrill-Sands and Sachdeva 1992; Outlook on Science Policy 1991; Ranadive 1991; Sharma 1991; Stolte-Heiskanen, 1991; UNESCO 1991, 1989, 1988, 1987, 1980).

As economic development in the Third World opens up more opportunities for education and employment, "women's choices naturally expand [and] women tend to enter the formal labor force" (World Bank 1990). Agricultural research is clearly one area where these trends are contributing to the number of women available for professional careers. There is evidence of significant numbers of women in agricultural research in developing countries, particularly in Asia:

- in the Philippines in 1992, women comprised 53% of researchers with an MSc or PhD degree in four research institutes;
- in Thailand in 1992, women comprised 44% of agricultural researchers with MSc or PhD degrees in government research organizations (Department of Agriculture, Thailand, 1992);
- in Sri Lanka in 1991, women comprised 27.5% of the agricultural researchers with an MSc or PhD degree in 19 research institutes (CARP, 1991).

The increased number of women scientists is changing the staff composition of research organizations in some developing countries, and these changes have implications for human resource management. Research managers need to learn how to maximize the advantages and cope with new challenges that arise from the new mix of people in the work force. The key issues revolve around ensuring

- that research organizations effectively tap the expanding pool of women scientists and professionals in recruitment;
- that once women have been hired, their organizations maximize their capacity to conduct research and provide opportunities for them to develop productive and fulfilling careers;
- that women and men develop effective working relationships as colleagues, supervisors, and subordinates;
- that talented women be retained by the organizations;
- that women's productivity is not hindered by conflicts between work and family responsibilities.

The International Service for National Agricultural Research (ISNAR), an international center supported by the Consultative Group for International Agricultural Research (CGIAR), has the mandate to assist developing countries in strengthening their agricultural research systems through improved research management. Given this mandate, ISNAR has chosen to address the issue of women in science by focusing on the human resource management issues of integrating women into largely male organizations (Brush and Rao 1991). With support from the CGIAR Gender Program, which is based at the CGIAR Secretariat, ISNAR designed a study to highlight major management issues arising from changes in the number of women in agricultural science in developing countries.

Based on a review of the literature on women in science in industrialized countries, primarily in the United States where this is a major field of research, four key questions were posed for the research:

- why is there an increase in the proportion of women in agricultural research in some developing countries?
- are women underrepresented in senior scientific and management positions in agricultural research organizations in some developing countries and, if so, why?
- how does an increase in the number of professional women affect the issues that managers have to deal with and the institutional response to these issues?
- how do different proportions of men and women in agricultural research organizations in developing countries affect the perceptions, behavior, and quality of interactions between men and women in the work place?

The first question primarily addresses the supply of women scientists and professionals as well as recruitment and retention of women within research organizations. The second question looks at career attainment and advancement, comparing the opportunity structures for men and women in research organizations. The third question focuses on management policies and practices, examining how these may have to be changed as women come to make up a larger share of the professional staff. The final question examines the more informal side of the organization, focusing organizational culture, informal communication and power structures, behavior, perceptions, and the quality of working relationships between men and women. Together, the four questions provide a robust analysis of the issues and op-

portunities of integrating more women into the professional staff of research organizations. Lessons and recommendations derived from the study are presented in the final chapter.

As discussed in the report that follows, we selected the Philippines as the country in which to try to answer our questions about women in agricultural science because it has, probably, the highest level of participation of women in agricultural science of any country in the world. And for this reason, we hope that answers to questions raised in the Philippines will be useful to other countries where there is increasing participation of women in science.



## 2. Case-Study Methodology

We organized the research methodology around our four questions concerning issues of women in science in developing countries: increasing numbers, career attainment, management responses, and organizational behavior. For each question, based on literature dealing with the issue and our experience in research management, we formulated several propositions about the situation we expected to find in developing countries (annex 1). These propositions indicated the kind of data we needed to collect in order to answer our questions. Two approaches data collection seemed appropriate: a human resource survey to gather information to describe the incidence or prevalence of factors related to the issues and a case study to explain factors that need to be traced over time in addition to mere frequency or incidence. We adopted the case-study approach as our primary research method and included survey data as an important source of evidence.

*A case study is an empirical inquiry that*

- *investigates a contemporary phenomenon within its real-life context; when*
- *the boundaries between the phenomenon and context are not clearly evident; and in which*
- *multiple sources of evidence are used.* (Yin 1984, p.23)

As discussed in the introduction, we needed a method we could use in countries with different levels of women's participation in science. Consequently, we designed a research method for developing countries in general rather than for a specific country. The Philippines is the first study in which we have used this design.

We selected the public-sector component of national agricultural research systems as our first unit of analysis. While most countries have public and private components in agricultural research, the public overshadows the private component in many developing countries (Pardey, Roseboom, and Anderson 1991).

### Country Selection

We classified national agricultural research systems according to the proportion of professional women in their public-sector research organizations: low participation (where less than 10% of the professional staff are women), medium participation (10% to 25% women), and high participation (above 25% women). We decided to initiate our study in a high-participation country, hoping that knowledge of the issues in such a country might benefit countries in which the numbers of professional women are increasing. ISNAR data on agricultural research systems in developing countries showed that the Philippines and Thailand had high proportions of women in science. The Philippines Council for Agriculture, Natural Resources and Forestry Research and Development (PCARRD) expressed interest in participating in the study; consequently, the Philippines, where women make up 40% to 50% of the professional staff in agricultural research, was selected for the initial case.

## **Selection of Research Institutes**

In addition to considering the proportion of women in a research system, our propositions involved notions that geographic location (metropolitan versus rural) and research discipline (field versus laboratory) would affect women in science. To enable comparisons among research locations and disciplines, we decided to study a variety of institutes as another unit of analysis.

In the Philippines, PCARRD is an apex body responsible for coordinating agricultural research among a group of diverse and semiautonomous public-sector organizations. It coordinates a wide range of research institutes: single- and multicommodity institutes which are spread throughout the archipelago, from urban to rural locations. Annex 2 describes PCARRD overall.

We analyzed ISNAR information about institutes in the Philippines in order to identify those with a variety of locations and disciplines and selected four institutes:

Philippine Rice Research Institute (PHILRICE), with stations in Los Banos (southern Luzon), Muñoz (central Luzon), and Midsayap (northern Mindanao);

- Philippine Institute of Biotechnology and Applied Microbiology (BIOTECH) in Los Banos;
- Philippine Institute of Plant Breeding (IPB) in Los Banos;
- Philippine Root Crops Research and Training Center (PRCRTC) in Baybay (Leyte).

These institutes include facilities with both a single- and multi-commodity focus and with a variety of field and laboratory disciplines and research locations (table 2.1). Each has a high proportion of women (table 2.2). Annex 2 describes these institutes in more detail.

**Table 2.1 Institutes Selected for the Philippine Case Study**

<b>Geographic Location</b>	<b>Research Focus</b>	
	<b>Single-Commodity Institutes (Stations)</b>	<b>Multi-Commodity Institutes</b>
More Metropolitan	PHILRICE (Los Banos)	BIOTECH, IPB
More Rural	PHILRICE (Maligaya & Mindanao)	PRCRTC



**Table 2.2 Scientists and Managers in the Cast-Study Institutes**

<b>Institutes</b>	<b>Women</b>		<b>Men</b>		<b>Total</b>	
	<b>#</b>	<b>%</b>	<b>#</b>	<b>%</b>	<b>#</b>	<b>%</b>
BIOTECH	75	73.5	27	26.5	102	34.5
IPB	30	47.6	33	52.8	63	21.3
PHILRICE	44	42.7	59	57.3	103	34.8
PRCRTC	11	39.3	17	60.7	28	9.5
Total	160	54.1	136	45.9	296	100.0

## The Study Team

To prepare for and conduct the study in these institutes, we formed a team composed of staff from the Philippines and ISNAR. PCARRD provided two staff members from headquarters and one staff member from each study institute. Three ISNAR staff members completed the study team.

## Selection of Respondents

Our propositions included notions about individuals, such as location preference, discipline preference, and work-family conflicts. This required another level of analysis: the gender group (men professionals, women professionals). As a result, our study has three units of analysis: national agricultural research systems, institutes, and male and female professionals.

To understand the perceptions of individuals, we planned to include a variety of respondents from the professional staff at each institute—male and female scientists, managers, and administrators. Information from respondents would be collected during individual interviews and group discussions.

To guide the selection of staff to be interviewed, we analyzed descriptive information about each institute, including its organizational structure and research programs. We then prepared an interview plan requesting each institute to select managers and scientists by type (e.g., men and women institute directors, program managers, personnel administrators, crop production scientists, crop protection scientists, engineers, extension specialists, etc.). The institutes selected the respondents who participated in the interviews and discussions; 64 professionals were selected to be interviewed (table 2.3). We were satisfied that the respondents adequately reflected the profile of professional staff at each institute.

**Table 2.3 Respondents Selected to be Interviewed**

<b>Institute</b>	<b>Professional Type</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
BIOTECH	Scientist	4	6	10
	Manager	1	2	3
	Administrator	0	1	1
IPB	Scientist	5	5	10
	Manager	5	0	5
	Administrator	1	0	1
PHILRICE	Scientist	4	8	12
	Manager	3	2	5
	Administrator	0	1	1
PRCRTC	Scientist	4	7	11
	Manager	3	1	4
	Administrator	0	1	1
Total	Scientist	17	26	43
	Manager	12	5	17
	Administrator	1	3	4
	All	30	34	64

In addition, each institute selected 8-12 professionals to participate in group discussions, or focus groups. A total of 38 professionals joined the focus groups, and about half of them also participated in an individual interview. As a result, the study involved about 80 professionals, all selected by the institutes.

## **Data Collection Methods**

Based on our research questions and units of analysis, the need for four sources of data emerged: survey, interview, focus group, and documentation from national and institute levels. Data collection requirements were specified for each source.

### **Survey Data**

ISNAR already had data about staff from three of the institutes before the study was initiated. These data were obtained in 1988 ( and PHILRICE) and 1989 (PRCRTC) and consisted of files from ARIS (Agricultural Researcher Information System, a human resource survey method and self-contained application program developed by ISNAR) (Zuidema 1989). Annex 3 presents the ARIS survey instrument. We planned to update the existing ARIS files from IPB, PRCRTC, and PHILRICE and to conduct an ARIS survey of BIOTECH. PCARRD team members administered ARIS to all professional staff at BIOTECH; a new ARIS survey was also conducted at PRCRTC. Since ARIS does not include data on marital status, we updated all ARIS files with this information using staff lists from the institutes. We combined the files from the institutes to create a study data base with survey information on 296 staff.

## **Interview Data**

Interviews were a crucial part of our research effort. We formulated a set of 77 interview items based on our research questions and propositions (annex 4). Most of these items were questions that entailed expository responses; a few questions called for enumerative (check-list) answers.

Using these questions, three open-ended but structured interview schedules were prepared, one for each staff type to be interviewed: scientist, manager, and administrator. Each interview schedule had questions that were appropriate for the intended interviewee. We tested the interview schedules at BIOTECH, the first institute in the study, and based on this test, we revised some of the questions. The major change was to add questions about the work environment and working relationships between men and women. All participants were provided the questions prior to their interview session.

Philippine and ISNAR team members conducted the interviews together during a two-week period in November 1992. The study team spent about three days at each institute, conducting a total of 64 interviews, each one of which lasted approximately two hours. Responses were recorded in writing by the team members during the interviews. Following each session, the records of the team members were compared and synthesized into one record for each interview. The result was an interview data base with 64 records.

## **Focus Groups**

A group session was held with eight to 10 staff members at each institute, with discussions were led by ISNAR. The purpose of the discussions was to generate information from interactions among group members and to discuss and test preliminary conclusions and ideas emerging from the interviews. Information was sought in certain key areas but groups were encouraged to talk freely. The discussions covered topics such as the gender stereotypes held by Filipino men and women scientists and managers, gender-related policies and problems in research in general and at the institutes in particular, the contraction of the male cadre at the institutes, perceived differences in the opportunities and constraints confronting men and women, and problems experienced by dual-career families. Group discussions lasted approximately two hours each. Discussion notes were recorded in writing by PCARRD team members.

## **Documentation**

In addition to data from ARIS, interviews, and group discussions, we collected staff lists, personnel manuals, publication records, reports of attrition, etc., from PCARRD and from each institute. We also collected data on degrees awarded during 1970-1990 from two leading agricultural-science universities in the Philippines: the University of the Philippines at Los Banos and Visayas State College of Agriculture. National information from the Philippine Civil Service Commission and materials about women in science from the Philippine Congress and from the National Commission on the Role of Filipino Women were also collected.

### **Data Analysis, Follow-up, and Development of Recommendations**

Survey data were analyzed using REFLEX, a data-base program. We used askSam, a text-retrieval program, to analyze interview data and Excel, a spreadsheet program, to analyze data on degrees awarded by the two Philippine universities. Statistical analyses included chi-square and two-tailed tests of significance (Bailey 1987; Snedecor and Cochran 1980).

Following data analysis and the preparation of a preliminary report, several members of the study team discussed the results with scientists and managers at each of the study institutes and with representatives of research and development agencies in the Philippines. These discussions were used to develop a set of recommendations resulting from the study.

We set out to answer four research questions. Each of the next four chapters in this report includes a discussion of the results for one question. Since this was a pilot case, we do not have comparative data about different developing countries—our first unit of analysis. Instead, to enrich our analysis of the Philippine case, we have drawn upon the extensive research on women in science in industrialized countries, principally in the United States and used this research as a comparative base from which to look at the situation in the Philippines.

### 3. Growing Participation of Women in Agricultural Research in the Philippines

The proportion of professional women in research organizations is affected by three key factors:

- *supply*—the size and quality of the pool of scientists and professionals in the disciplines and fields relevant to the organizations;
- *access*—the degree to which the organizations are open to and attract women;
- *retention*—the degree to which women who enter the organizations remain.

The participation of women in agricultural research in the Philippines has increased significantly since the 1970s. Today, women in the Philippines constitute a high proportion of public-sector research staff compared to other countries. Although no figures are available for the research system as a whole, data from four major public-sector agricultural research organizations indicate that women comprise about 50% of the scientific and professional staff.

Our study analyzed the factors leading to this high level of female participation in agricultural research. We collected data on changes in the supply of potential recruits, factors leading men and women to choose science and agricultural research as a profession, factors leading men and women to select specific types of research organizations, and factors contributing to the retention of men and women in the profession.

#### Supply

The global trend towards increasing participation of women in science is seen dramatically in the Philippines. The number of female scientists increased tenfold between 1975 and 1983, and their proportion of total scientists increased from 21% to 45% (table 3.1). Women scientists are concentrated in government agencies and academe, where they make up 60% of research and development (R&D) workers. In the Department of Science and Technology alone, women occupied 68% of technical positions in the 1980s (National Commission on the Role of Filipino Women 1990).

**Table 3.1 Changes in Number and Percent of Women Scientists, 1975-1983**

Year	Number of Women Scientists	Women as % of Total Scientists
1975	106	21%
1980	374	34%
1983	1060	45%

Source: National Research Council of the Philippines, as cited in Gonzalez (1992).

It is interesting to note that the participation of women in science is higher than their participation in the Philippine work force as a whole. Women represented only 36% of the adult population in the work force in 1987, a level considerably lower than the average for Southeast Asia (United Nations 1991). The statistics indicate that women have been actively choosing science as an occupational niche.

Six factors appear to be important in explaining this high level of female participation in science in the Philippines:

- increased educational opportunities for women;
- the relative status of science as compared to other occupations;
- the prevalence of research jobs in government agencies and academe;
- the relative gender-neutrality of science as an occupation;
- the growth of dual-career families;
- women's changing aspirations and career goals.

### **Increased Educational Opportunities**

A major factor influencing women's increasing involvement in science is the expansion of educational opportunities for women. Public schools were established at the turn of the century, which permitted social mobility for both boys and girls (Guzman and Estuara 1991; Vitug 1994). In the early 1980s, women represented 50% of the enrollment in elementary and secondary schools in the Philippines. This is somewhat higher than the average for Southeast Asia and much higher than the average of 28% for South Asia, where women's participation in science remains low. Women now surpass men in enrollment in universities in the Philippines, making up 54% of all university-level students (United Nations 1991).

Furthermore, there has been an increasing emphasis on science in elementary and secondary education during the past 20 years. Over 60% of the women scientists interviewed indicated that they had become interested in science in elementary or high school. Many had been inspired by a science or math teacher, often a woman, at an early age. The increasing visibility of women in science also signaled to young women that they could enter and develop careers in this profession. Sixty percent of the female respondents indicated that they knew women scientists, professors, or teachers when they were young. In focus groups when participants were asked to identify outstanding agricultural scientists, they invariably named both men and women.

*In the past most of the professions were dominated by men. The old folks said that women should stay at home. But they are now given equal opportunity to go to school, which has changed the proportion of women in most of the professions. (female scientist)*

Women's access to higher education has particular bearing on their ability to enter science, an occupation heavily dependent on educational qualifications. Advanced degrees give women the objective credentials needed to enter this occupational niche, particularly in the public sector where requirements are standardized. As is common in many countries,

women have not been as successful in developing scientific careers in the private sector (Guzman and Estuara 1991; National Commission on the Role of Filipino Women 1990).

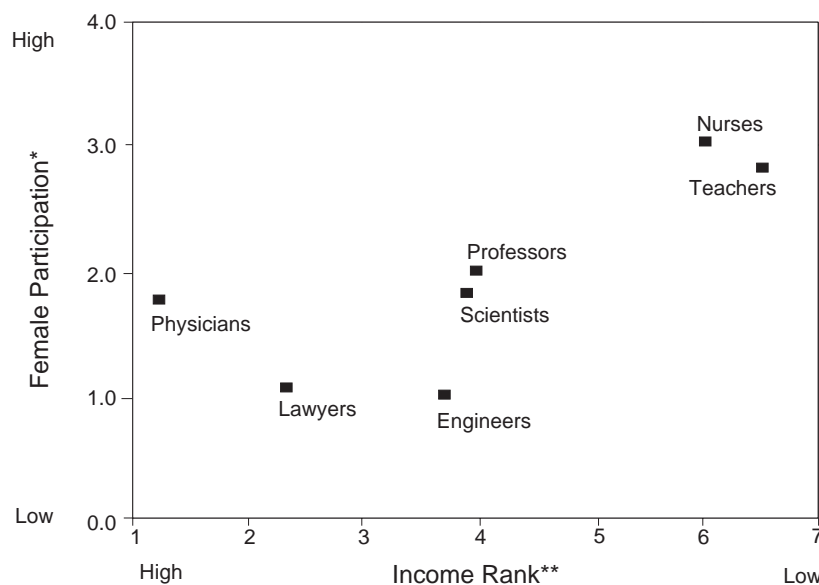
### Status of Science as an Occupation

Based on observations from other countries, we hypothesized that the relatively high participation of women in science in the Philippines reflected its lower status compared to other professional occupations.

Within an occupational group women are almost always in the less prestigious jobs. For example, there are many more women than men in lower-paid professional and technical occupations, such as teaching, the largest occupation in this category. As the level, prestige, and pay go up so do the number of men—who take an overwhelming majority of the jobs in, for example, higher education. (United Nations 1991, p. 87)

We explored this hypothesis by asking interview respondents to rank seven major professions in terms of income level (which was used as a proxy for status). We then asked them to indicate whether the members of the occupations tended to be mostly women, mostly men, or equally distributed across the sexes. The results are shown in figure 3.1.

The response trend supports our hypothesis. Respondents perceived the lower-paying professions, such as nursing and teaching, to be female dominated. Few women have penetrated the traditionally male-dominated, high-status professions of lawyers and engineers



\* 1 = mostly male participation; 2 = balanced male/female participation; 3 = mostly female participation.

\*\* 1 = high-income level; 7 = low-income level.

**Figure 3.1 Perceptions of relative income and participation by women in major professions (N=64)**

(Guzman and Estuara 1991; National Commission on the Role of Filipino Women 1990). Participation of men and women is more or less equal in the middle-ranked professions of scientists and professors. The exception to the trend is physicians, which is viewed as the highest paying occupation. This was traditionally male dominated but is now perceived to have almost equal levels of participation of men and women. It is not clear why women have been able to move heavily into medicine, but they do tend to cluster in specific areas of specialization (Guzman and Estuara 1991; National Commission on the Role of Filipino Women 1990).

The suggested inverse relationship between economic opportunities within a profession and the level of female participation was also observed by our respondents:

*During the past 10 to 15 years it has changed from mostly men in science to having many women. Women realized that the profession was worthwhile and many men entered the private sector or took more lucrative international assignments. (male scientist)*

*Nursing is primarily made up of women, but men are moving more into nursing now because there are lucrative opportunities abroad. (female scientist)*

### Gender Neutrality of Science as a Profession

Related to the status of science is the perception that it is relatively gender neutral as a profession. This perception has likely made science more open to women. In contrast, there was a high level of agreement among respondents that women have not entered law and engineering in large numbers because these professions require traits that are perceived as characteristic of men in Filipino society. Similarly, nursing and teaching, dominated by women, were viewed as requiring traits characteristic of women, particularly in their roles as mothers and wives (table 3.2).

**Table 3.2 Key Traits Cited for Members of Male-Dominated and Female-Dominated Professions in the Philippines**

Male-Dominated Professions		Female-Dominated Professions	
Law	Engineering	Teaching	Nursing
aggressive	field oriented	patient	caring
decisive/forceful	physically strong	caring	patient
strong public speaking	mobile	nurturing	kind/considerate
	aggressive/risk-taking	good with children	empathic

In contrast, respondents had few gender-based stereotypes of scientists or university professors. Similar types of stereotyping emerged, however, regarding the different disciplines within agricultural research (see also chapter 4).



### Prevalence of Public-Sector Job Opportunities

Many respondents explained the increased numbers of women in science as a result of the concomitant exodus of men from the public sector into the private sector. Salaries tend to be lower in the public sector, and men, who are still considered to be the primary breadwinners in Filipino families, have tended to move, when possible, into more lucrative opportunities in the private sector or overseas, or into other professions. In contrast, positions in the public sector can be attractive to women, for the reasons discussed below.

*The men have gone to private industries, but the women have stayed in the universities for convenience because they have to take care of their homes and families. (female manager)*

*Men tend to go to private business or private industry rather than stay as scientists in the university. The pay is better, but there is more work and overtime. The government agencies where the women scientists work are less strict so it is good for married women, who have additional responsibilities, because the work is less demanding. (female scientist)*

As men shifted out of science and technology in the public sector, women began to fill these positions. Since women's income is still viewed as "supplementary," they are not under the same pressure as men to seek high-paying jobs. Moreover, in addition to providing interesting career opportunities, positions in government and academe can offer important benefits to women. These positions are part of the civil service structure, which generally protects women against overt discrimination in remuneration and advancement. Other benefits include job security, stability in terms of the place of employment, flexibility in managing time (which allows women to cope with work and family responsibilities), limited demands for overtime, good health and maternity benefits, and opportunities for government-financed training and scholarships. Similar factors have been noted to influence women scientists' choice of a career in government in Thailand (Salag Dhabanandana 1991) and in academia in the USA (Northrup 1988).

### Economic Necessity

Several respondents cited economic necessity as a key motivating factor causing women to seek professional opportunities. Families need two incomes to achieve the standard of living to which they aspire, and this has become increasingly important during the economic downturn of the 1980s. Although this was not consistently cited as an explanatory factor affecting the entrance of women into scientific positions, it was almost uniformly cited as a reason for why women do *not* leave the work force when they have children.

*Before, men dominated science. Men were the 'breadwinners' and they were the ones employed while women stayed home. Today, because of hard times, women are forced to take jobs. This change started about 10 years ago. Women were already educated but priority had been placed on the family and they did not work. They had the tool ready—their education. When times got rough, they used the tool and went to work. (male scientist)*

### **Changing Aspirations and Goals**

With expanding educational opportunities, women's career aspirations and goals have changed. Women have moved into new occupations, they have moved further up the career ladder, and they have become more visible in a wide range of professions. Roles and expectations are changing and most of the women interviewed stated clearly that they would not give up their jobs even if they could afford to. But women appear to have taken on new professional roles faster than men have taken on new domestic roles. Women still have primary responsibility for family, children, and management of the household. As discussed in chapter 5, these multiple demands, often referred to in the literature as the "double burden," affect women's professional roles, their expectations for career attainment, and their ability to move into senior, decision-making positions.

The enhancement of women's roles, however, does not mean their role as wife and mother has been obliterated by their role as income earner. In effect, it has led to a multiplication of roles, now encompassing both home and career. This multiple role of women carries a modified—though basically similar—concept of feminine attributes like gentleness, modesty, and nurturance. (Pundol 1992, p. 63)

### **Agricultural Science**

Before the 1970s agriculture was considered to be a male sphere of activity.

Since the 1970's women have been increasing in fields traditionally dominated by males, such as chemical engineering, medicine, and agriculture. (National Commission on the Role of Filipino Women 1990, p. 192)

Data on bachelor's degrees awarded to men and women from the two largest and most prestigious agricultural universities in the Philippines—the University of the Philippines Los Banõs (UPLB) and Visayas State College of Agriculture (VISCA)—show a dramatic increase in the number and percentage of women studying in agriculture and related disciplines in the late 1970s and early 1980s (table 3.3, figure 3.2, annex 5).

**Table 3.3 Bachelor's Degree in Agriculture and Related Disciplines Awarded to Women by UPLB and VISCA, 1972-1990**

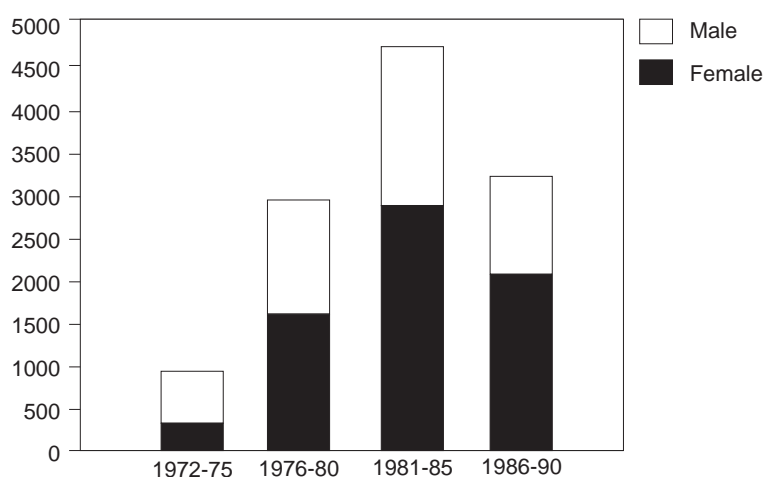
University	Discipline	1972-1975		1976-1980		1981-1985		1986-1990	
		No.	Women as % of Total	No.	Women as % of Total	No.	Women as % of Total	No.	Women as % of Total
UPLB	Agriculture <sup>1</sup>	217	43%	548	49%	477	55%	250	48%
UPLB	Agriculture related <sup>2</sup>	186	38%	994	54%	1831	65%	1692	63%
VISCA	Agriculture					154	56%	138	58%
VISCA	Agriculture related					418	65%	526	72%

Source: Data provided by the registrars' offices at the University of the Philippines at Los Baños and Visayas State College of Agriculture.

<sup>1</sup>Agricultural disciplines include traditional disciplines such as agronomy, animal production, animal nutrition, entomology, horticulture, plant pathology, plant breeding, and soil science.

<sup>2</sup>Agriculture-related disciplines include economic, management, and social sciences; extension-related disciplines; food technology; selected arts and sciences (such as applied math, applied physics, biology, botany, chemistry, computer sciences, statistics, and zoology); engineering and agroindustrial technology, forestry, and human ecology.

Data on master's degrees awarded at UPLB show similar trends (table 3.4, figures 3.3 and 3.4, annex 6). Master's degrees are good indicators of the supply of researchers since the vast majority of men and women in the study received their master's degrees from Philippine universities. The data show a marked increase in the participation of women in the agricultural sciences, both in absolute numbers as well as in terms of the relative proportion of degree recipients during the past two decades.

**Figure 3.2 Bachelor's degrees awarded to men and women in agriculture and related disciplines by UPLB and VISC, 1972-1990**

**Table 3.4 Master's Degrees in Agriculture and Related Disciplines Awarded to Women by UPLB, 1972-1990**

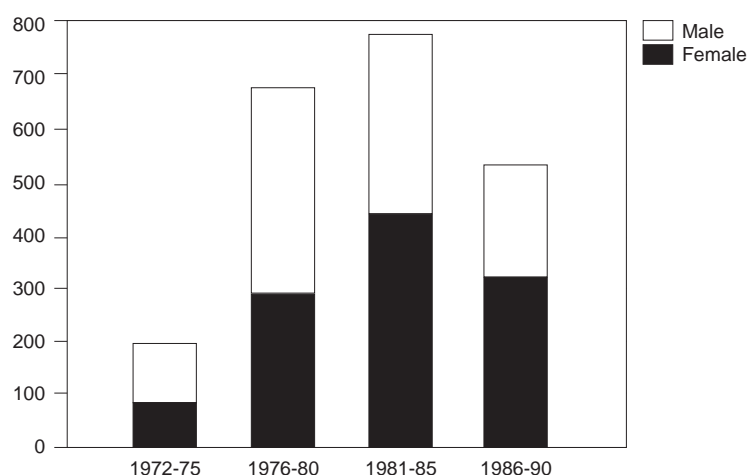
Discipline	1972-1975		1976-1980		1981-1985		1986-1990	
	No.	Women as % of Total	No.	Women as % of Total	No.	Women as % of Total	No.	Women as % of Total
Agriculture <sup>1</sup>	11	16%	96	29%	158	41%	106	44%
Agriculture related <sup>2</sup>	51	46%	192	55%	275	69%	207	69%
Total	62	35%	288	42%	433	55%	313	58%

Source: Registrar, UPLB (1993). Data compiled by Virginia Mabesa, PCARRD.

<sup>1</sup>Agriculture disciplines include traditional disciplines such as agronomy, animal production, animal nutrition, entomology, horticulture, plant pathology, plant breeding, and soil science.

<sup>2</sup>Agriculture-related disciplines include economic, management, and social sciences; extension-related disciplines; food technology; selected arts and sciences (such as applied math, applied physics, biology, botany, chemistry, computer sciences, statistics, and zoology); engineering and agroindustrial technology, forestry, and human ecology.

The age of the institutes in the study did not appear to be an important factor in the distribution of women among them (see table 2.2). Specifically, the proportion of women in PHILRICE, a more recently formed institute (1985), was not statistically different from the proportion of women in older institutes, IPB and PRCRTC (which both date from 1975). There was no evidence of a 'cohort' effect, i.e., a higher proportion of women in recently formed institutes by virtue of the fact that there are more women entering the labor market. Perhaps the age separation of the institutes is insufficient to produce a measurable cohort effect.



**Figure 3.3 Master's degrees awarded to men and women in agriculture and related disciplines by UPLB, 1972-1990**

The dramatic increase in the participation of women studying agricultural and related sciences can be explained by four factors in addition to those affecting the overall increase of women in science:

- the relative status of agricultural research as a profession;
- expanding job opportunities in agricultural research;
- increasing gender neutrality of the profession;
- expansion of disciplines considered relevant for agricultural research.

### **Status of Profession**

As with science as a profession, we hypothesized that the increase of women in agricultural research reflected its comparatively lower status among scientific fields. We expected that the trend in agricultural science was similar to that which occurred in teaching. This field became female dominated when wages became less competitive and men moved out to find more higher-paid occupations.

*In the 1950s and 1960s, there were many more men in teaching. As salaries declined, however, men moved into more lucrative positions and women came to dominate the profession. (male manager)*

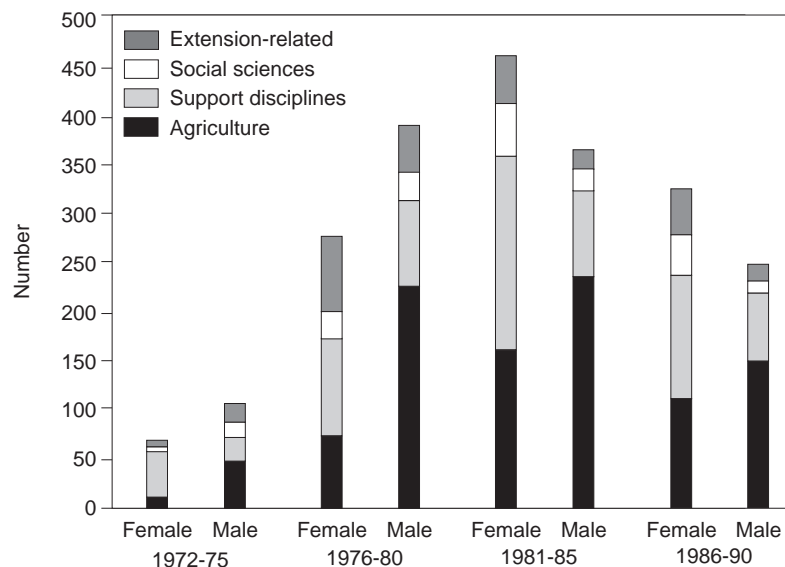
To examine this proposition, we looked at gender-disaggregated data on the supply of researchers to see if men were being replaced by women in the profession. We also asked our respondents about their reasons for going into agriculture and their career aspirations and choices. If agriculture was a second choice or “fall-back” profession for many of the men and women in the study, we thought this would indicate that it was a lower-status profession. The data support our hypothesis, but they are not sufficient to make a conclusive argument.

The gender-disaggregated data on degrees awarded in agriculture and related disciplines indicate that men began to leave the profession in the 1980s and women increasingly made up a larger share of the potential recruits (tables 3.3 and 3.4, figures 3.2, 3.3, and 3.4). Administrators and scientists interviewed observed that women now make up a larger share of the pool of potential recruits than men.

*More and more women are now students in science disciplines. In fact university administrators want to encourage more men to enter agricultural science in order to maintain a balance. (male administrator)*

These trends appear to reflect the declining status and income level of agricultural research as a profession. Respondents explained that men moved out of lower-paying public-sector agricultural research jobs into more lucrative professions or positions in the private sector. This exodus probably reflects the stagnation in government salaries for researchers, which have not increased since 1986. As funding for the sector declined, women appear to have replaced men within in a contracting pool of agricultural graduates.

The interview data suggest that agricultural science was not as high status or as highly appreciated as some other professions. Only half of both the men and women interviewed



**Figure 3.4 Master's degrees awarded to men and women by UPLB, by disciplines, 1972-1990**

indicated that agricultural science had been their first choice as a profession. Although women asserted a preference for agriculture more strongly than men, the difference was minor. The remaining 50% of the respondents had wanted to pursue another career but were not able to either because of financial constraints or because their family objected. Education for some professions, such as medicine, law, nursing, or architecture, is expensive and often government scholarships are not as available. Men and women did not differ significantly in the constraints that inhibited them from pursuing their first choice of careers. The dominant professions that had attracted men and women reflect the gender-stereotyping of professions noted above. Men were primarily attracted to the higher-status professions of medicine, law, and engineering; and women, to teaching and nursing.

In summary, the data suggest that the declining status of agricultural research in the 1980s, particularly in terms of income levels in the public sector, may have been a factor leading to the increased participation of women in the profession. Other factors were also important, such as educational cost and the absence of gender stereotyping for science.

### **Expanding Job Opportunities**

Job opportunities in agricultural research expanded rapidly in the 1970s and early 1980s as agriculture became more science-based and research came to be viewed as instrumental for agricultural development. The Philippine government gave high priority to agriculture in its development plans and to research as a means for rapidly increasing production to meet escalating food needs. Moreover, donor support from a major USAID project (1970 to 1985) placed a high priority on human resource development for strengthening agricultural re-

search and extension in the Philippines. This opened up many opportunities for training and for being assured of a job after training.

These expanding opportunities were important in attracting both men and women to the agricultural sciences from the mid-1970s to the mid-1980s. As shown in table 3.5, agricultural research staff in the public sector in the Philippine NARS grew by more than 150% between 1961-65 and 1971-75, and by 100% between 1971-75 and 1981-85 (Pardey, Roseboom and Anderson 1991).

**Table 3.5 Growth in the Philippine NARS, 1961-1985**

Year	1961-65	1966-70	1971-75	1976-80	1981-85
Number of scientists	375	519	973	390	1965

Source: Pardey, Roseboom and Anderson (1991).

### **Increasing Gender Neutrality of Profession**

As agriculture became more science based and research came to be seen as a key means for fueling agricultural production, the close association between agriculture and farming, traditionally viewed as a male sphere of activity, broke down. Training in agriculture came to be associated more with science and technology development than with farming, which made the field more gender neutral and led to increased opportunities for women. This shift is nicely summed up in the words of one respondent:

*Before, women did not select agriculture [for training] because it was associated with farming, which is the domain of men. But during the 1970s, the University of Philippines Los Banos changed its curriculum to focus on science and research rather than farming. With the change, women saw more opportunities for themselves in this profession. (male manager)*

### **Expansion of Disciplines**

A fourth, and important, factor influencing the increase of women in agricultural science was the broadening of the disciplines considered relevant for agricultural research and technology development. In particular, the increased emphasis on support disciplines, such as entomology and plant pathology, and other agriculture-related disciplines, such as food technology, social sciences, and extension, opened up new opportunities for women. The data on bachelor's and master's degrees show that women in particular took advantage of these expanding opportunities in the wider set of disciplines (tables 3.3 and 3.4). Women moved into the agriculture-related disciplines at a faster rate and on a larger scale than they did into the more traditional agricultural disciplines, which were dominated by men.

The distribution of women earning bachelor's degrees at UPLB across major disciplinary areas shows a contraction from the 1970s to the 1980s in the percentage of women studying traditional agriculture and an expansion of women studying economics, social sci-

ences and agriculture-related natural sciences such as biology, chemistry, physics, and math (figure 3.4). Interestingly, women have been predominant in agricultural education and extension-related fields even though these are more field-oriented disciplines.

The data on master's degrees awarded at UPLB also show that women predominate in the support disciplines, social sciences, and extension sciences. Women represent almost 70% of the master's recipients in these disciplines in the 1980s (figure 3.4). Data on PhD degrees from UPLB show similar trends, but it is difficult to draw useful comparisons between male and female profiles for PhDs since the majority of men have studied abroad.

In summary, events that have occurred in the Philippines over the past two decades have undoubtedly opened up many opportunities for women in agricultural research. Women have been attracted especially to new opportunities in the support disciplines. Many of these are laboratory based, have provided good career prospects, and were not previously dominated by men (see chapter 4). More generally, most of the jobs in agricultural research have been in the public sector, which has traditionally been attractive to women.

## **Access**

Access is affected both by the degree to which a profession or organization is open to women as well as by the degree to which women are attracted to it. The majority of jobs in agricultural research are open to women because they are in the public sector and are governed by civil-service regulations for equal opportunity. Respondents almost uniformly observed that women did not experience discrimination in recruitment to public-sector research organizations. This supports findings of other studies of women in science in the Philippines (Guzman and Estuara 1991).

*There are more women at this organization. . . . I think that [is] because there are more women graduates, there are more women applicants for the jobs. The director prefers high academic ranks and the women applicants usually have higher grades than male applicants. I have observed that women students are more diligent in their studies than men. (male manager)*

Nevertheless, the interviews revealed that access may be affected by gender stereotypes about the types of jobs for which men and women are better suited. Women were seen as preferred for laboratory work where it is perceived that diligence, precision, and patience are needed. Men were seen to be preferred for jobs requiring field work, travel, overtime, or night shifts, or the supervision of male field-workers. However, these stereotypes may have affected women's access to jobs in the private sector more than in the public sector.

Based on findings from other countries, we expected to see differences between men and women in the factors leading them to select specific research organizations in which to work. We expected women to be more concerned with the location of the institute in terms of proximity to family or to major employment centers where their spouse could obtain employment. We expected men to be more concerned with career opportunities and salaries since men are still considered to be the primary breadwinners in Filipino families. And, we expected men to place more emphasis on professional and personal contacts to gain access



to job opportunities. In many parts of the world the “good-old-boys’ network”—the informal network of professional and social contacts—still works more effectively for men than it does for women (Bielby 1991; Cole 1979; Fox 1991; Gibbons 1992c; Guzman and Estuara 1991; Reskin and Hartmann 1986; Sandler and Hall 1986). Statistical analysis of the interview data on reasons for selecting organizations (table 3.6) shows, however, that most of our expectations were not borne out.

**Table 3.6 Researchers’ Reasons for Selecting Organizations for Which They Work**

Factors influencing choice of organization	Female Respondents (N=29)		Male Respondents (N=27)		Total (N=56)	
	# citing factor	% of total women	# citing factor	% of total men	# citing factor	% of total
Contacts	12*	41%	14	52%	26	46%
Location of organization	9*	31%	6	22%	15	27%
Nature of job	9	31%	8	30%	17	30%
Good career	8	28%	11	41%	19	34%
Reputation of organization	7	24%	6	22%	13	23%
Employment	5	17%	2	7%	7	12%
Permanent post	4	14%	1	4%	5	9%
Salary	4	14%	1	4%	5	9%

\* The difference between the proportions of women citing contacts and locations is significant at  $p = .05$ .

Professional and personal contacts was the factor cited most frequently by both men and women in selecting their place of employment. But, contrary to our expectations, there was no statistical difference between the proportion of men and women citing this factor. Moreover, contacts were more important than location as a factor influencing women’s decisions. Also at odds with our expectations, there was no statistically significant difference between the proportion of men and women citing location as an important factor in their choice of organization. This contrasts with the human resource survey data from the case-study institutes, which show a higher percentage of women in the two research organizations based in Los Banos than in those located in more isolated areas where there are fewer external opportunities for employment (see chapter 4, table 4.1).

Continuing to run contrary to our expectations, the data also indicate no significant difference between the proportion of women and men who cited potential career opportunities or the reputation of the organizations as a factor in selecting their current place of employment. Surprisingly, few women or men cited salary or opportunities for a permanent post as a key factor in selecting their current organization.

We expected women to be more interested in working in organizations where there were higher proportions of women and where women were more visible in senior positions. We were not able to test this proposition thoroughly, but data collected through the inter-

views suggest that this was one of several factors influencing women's choices. Slightly more than half of the female respondents indicated that they had known women in the organization when they applied, and 45% stated explicitly that the presence of these women had influenced their decision to apply for a job or accept an offer.

In summary, women and men appear to have had equal access to research organizations in the public sector. Important factors affecting women's choice of organization for employment included personal and professional contacts, location of the organization, perceived opportunities for career advancement, professional areas of interests and expertise, and the reputation of the institute. Interview data show that similar proportions of men and women gave precedence to personal and family criteria in selecting an organization. These were not, however, dominant factors in their decision making; professional concerns remained the salient factor for both men and women in selecting the research organization in which they are currently employed.

## **Retention**

In the previous sections, we examined factors affecting the intake of female scientists and professionals into agricultural research organizations. In this section, we look at key factors affecting the outflow, or attrition, of women from organizations. We expected that the high rate of participation in Philippine organizations would be the result not only of changes in supply and open access, but also the result of women's interest in remaining within these organizations.

Analysis of retention is important since it is often assumed that high attrition is a major cause of the low level of participation of women in science worldwide. High attrition may be inferred from data on the loss of women in the science and engineering pipeline (Alper 1993; National Science Foundation 1990), but these losses affect the pool of recruits, not scientists working in research organizations. Conflicts with husband's careers and with family responsibilities are common explanations for the presumed attrition of working women scientists. In the literature, such assertions tend to be anecdotal (Amato 1992; Culotta 1993a; Culotta 1993b; Erzkowitz et al. 1992); few studies have reported overall trends (Thomas, Cotten and Luedke 1991). A recent review of studies on careers of men and women scientists in the United States concluded that family obligations have limited impact on women's work patterns:

Contrary to the widely held belief, women's work patterns are weakly related to their family obligations: women scientists with young children under six are more apt to be working or seeking work than those with older children. However, women's family obligations are generally assumed to affect their work histories, and these assumptions affect women's employment opportunities. (Zuckerman 1991, pp. 32-33)

Given the preponderance of anecdotal information on the attrition of women in the work place, we wanted to look at the relationship between attrition and family/domestic responsibilities in the Philippines. We collected data for men and women on attrition rates and on length of service, one indicator of retention. Through interviews and focus groups, we examined reasons for attrition and retention of men and women and the impact of

work-family conflicts. Finally, we also explored whether the presence of more women in an organization reduced rates of female attrition.

### Comparative Rates of Attrition

We compared quantitative data on attrition from two institutes, BIOTECH and PHILRICE. Contrary to our expectations, the attrition rates of men and women were comparable at each institute. However, as recent events at PHILRICE illustrate, the attrition of men and women may be influenced differently by the same organizational circumstance. In 1989, PHILRICE relocated its main operations from the university campus in Los Banos (also the site of BIOTECH) to a new, and more isolated, site in a northern province (Nueva Ecija). According to respondents, women were more reluctant than men to move their families to a new location or to leave their families in Los Banos and commute on a weekly basis. Relocation would have disrupted schooling of children and commuting would have removed the child care given by the mother during the week. Some women resigned rather than relocate. In contrast to the women, many men chose to commute on a weekly basis rather than relocate their families. Respondents observed that men have more flexibility to commute because they do not have primary responsibility for child care.

The consensus of respondents was that the attrition rate of women was not higher than that of men. Only a few (8%) thought women left their organizations more often than men. Most (43%) thought that women and men left at about the same rate, and a third thought that men left more often than women. These responses support the quantitative data available on attrition from the institutes.

The explanations given for why men and women left an organization showed a distinct dichotomy (table 3.7). Men were thought to leave more often for economic and professional reasons (higher salary, more opportunity), while women were thought to leave more often for family reasons (to relocate with husbands, to care for parents).

**Table 3.7 Reasons Attributed to Male and Female Attrition:  
Number of Respondents Citing Reason (N=49)**

Reasons	Explaining Men's Attrition	Explaining Women's At- trition	Explaining Both Men's and Women's Attrition
Economic career	28	8	11
Family	0	23	1
Other	1	5	3

In summary, the quantitative and qualitative data indicate that attrition is not higher for women than men but the causes for their attrition may differ. This conclusion is nicely summarized in the words of three respondents:

*Women tend to stay longer than men; they stay mostly because their children are in school. (female scientist)*

*Men leave because they get recruited for better jobs. Women usually leave to join their husbands. (female manager)*

*Family stability is often cited as a reason for staying but this affects women mainly. Men are freer to leave to seek for a better job. (male scientist)*

### Work-Family Conflicts and Length of Tenure

Work-family conflicts are thought to have an important bearing on the retention of women in scientific organizations. We expected that there would be a direct relationship between the extent of work-family conflicts experienced by staff and the rate of attrition. To test this, we collected data on work-family conflicts experienced by professional men and women through interviews and on staff retention and attrition.

Of those interviewed, 50% of the men and 58% of the women indicated they had experienced some conflict balancing personal responsibilities at home with professional responsibilities in their research institutes. Although male and female respondents reported similar types of conflicts, the intensity of the conflict was generally higher for women than for men.

Respondents indicated that women have greater family responsibilities than men and are more likely to experience conflicts (table 3.8). Responses show women are almost three times more likely than men to be responsible for family matters and to have experienced a high level of work-family conflict. The most severe conflict experienced by women was in caring for children. Within this, children's illness was mentioned most often as causing conflicts with work. Similar findings were reported by Guzman and Estuara (1991) in their study of women scientists in the Philippines.

**Table 3.8 Family Responsibilities and Work Conflicts in Philippine NARS (N=59)**

Responsibility	Who is Responsible			Level of Conflict Experienced by Women			Level of Conflict Experienced by Men		
	Women	Equal	Men	Low	Medium	High	Low	Medium	High
Child Care	36	25	-	4	11	44	26	24	5
Care of Elderly	22	36	-	8	29	17	24	23	4
Household Shopping	26	33	1	17	26	10	30	21	1
Cooking	46	14	-	15	16	25	40	8	1
Household Cleaning	22	36	-	14	24	16	29	21	1
Household Repair	-	10	51	39	9	-	17	12	28
Total	152*	154	52*	97	115	112**	166	109	40**

\*The difference between the number of citations for the responsibilities of men and women is significant at  $p = .005$ .

\*\*The difference between the number of citations for high level of conflict for men and women is significant at  $p = .005$ .

The reported division of responsibilities reflects the traditional pattern of task allocation by gender in the Philippines. Culturally prescribed behaviors are still deeply rooted and are reinforced by family, school, and religion: women do most of the household chores and have primary responsibility for child care; men are the primary breadwinners and heads of families (Guzman and Estuara 1991; Vitug 1994). Israel-Sobritchea (1990) argues that the Philippine society nurtures beliefs that tend to bind women to their traditional roles over other roles, setting up possibilities of contradictions between family and public life. However, the allocation of family responsibilities may be changing in the Philippines. For example, many of our respondents thought that men and women were equally responsible for caring for the elderly and for some household chores such as shopping and house cleaning. This indicates that some men have family responsibilities in addition to their roles as family head and breadwinner.

To explore whether the reported higher level of work-family conflicts for women led to increased attrition, we examined the length of service for married women compared to single women and men. We predicted that if women were dropping out of research organizations due to work-family conflicts, married women would have the shortest average length of service. In fact, single men have the shortest length of service; the length of service of married women is not statistically different from that of married men and single women (table 3.9). Looking at permanent staff alone, married and single women had equal lengths of tenure, indicating that the responsibilities that come with marriage and child rearing do not affect retention. The equal proportions of married women and men in the study institutes indicate that women are not choosing to forego marriage and child rearing in order to pursue scientific careers.

**Table 3.9 Civil and Contract Status and Average Length of Service (N=289)**

Civil Status	Contract Staff Length of Service (months)				Permanent Staff Length of Service (months)				All Staff Length of Service (months)					
	Female		Male		Female		Male		Female		Male		Total	
	#	avg mos	#	avg mos	#	avg mos	#	avg mos	#	avg mos	#	avg mos	#	avg mos
Married	8	99	13	108	63	114	61	105	71	112	74	105	145	109
Single	7	49	7	57	26	114	17	50	33	100	24	52*	57	80
Unknown	26	43	8	60	27	38	26	64	53	41	34	63	87	50
Total	41	55**	28	81	11	96**	104	86	157	86	132	85	289	85

\*The difference between the average months of single men and other staff (single women, married women, and married men) is significant at  $p = .01$ .

\*\*The difference between the average months of permanent status and contract status women is significant at  $p = .001$ .

Marital status as well as length of service is highly correlated with age. For example, while 38% of the women in the study under age 30 were married, 78% of those over 30 were married. However, comparing the length of service and marital status among women in different age cohorts, we found a difference only among those under 30. Among these younger women, married staff had a longer term of service than single staff (the difference was sig-

nificant at  $p = .05$ ). Among older cohorts (e.g., ages 31 to 40 and 41 to 50), the difference between the length of service of married and single women was not significant. Overall, marital status does not appear to affect length of service. Tenure (permanent versus contract status) appears to affect the retention of women more than men. While permanent-status women had longer lengths of service than contract-status women, tenured and untenured men had approximately equal lengths of service.

In summary, married women have more severe work-family conflicts than men but remain employed as research professionals at a rate similar to men and single women. In the case of the Philippine NARS, therefore, we may refute the proposition that there is a direct correlation between attrition and work-family conflicts. To the contrary, women's family responsibilities appear to be an important factor contributing to their retention. This is explained by the fact that public-sector jobs, particularly research jobs, which permit flexibility in scheduling time, allow women to balance work and family responsibilities effectively. However, while work-family conflicts were not seen as affecting retention, they were seen as affecting women's career advancement and their research productivity (see chapter 4).

### **Proportion of Women and Attrition**

We also expected that the attrition of women would decrease as their proportion increased in an organization. Our assumption was that organizations with higher percentages of professional women would be more hospitable to women, discrimination would be minimal or nonexistent, and policies and management mechanisms would be in place to assist women in balancing work and family responsibilities. All these factors would induce women to stay longer than they would in organizations with few women.

We examined this proposition by comparing the average length of service of women professionals across institutes with different proportions of female professional staff. The proportion of women in the four institutes varied from 39% to 73% (table 3.10). The data fail to support the proposition that there is a direct relation between the proportion of women and their retention. In fact, the relationship in the study institutes appears to be the inverse: PRCRTC has a lower proportion of women than BIOTECH but the women at PRCRTC have a longer length of service than the women at BIOTECH. It should be noted, however, that all the institutes have a large share of women on their staff and, therefore, may not differ significantly in the degree to which they provide a hospitable environment for women. A broader comparison of institutes is needed to test this proposition more thoroughly. According to Kanter (1977b), differences would be expected between institutes with 5% to 10% women compared to those with 40% to 60% women.

**Table 3.10 Average Length of Service of Professional Women at Three Institutes**

Institute	Women Professionals		
	Number	% of Professional Staff	Average Length of Service (months)
BIOTECH	73	76%**	98.1*
IPB	30	48%	129.1
PRCRTC	11	39%**	136.4*
Total	114	61%	110.0

*Note:* Data from PHILRICE were not included because the institute was established considerably later than the other case-study organizations.

\*The difference between the average length of stay of women at PRCRTC and BIOTECH is significant at  $p = .01$ .

\*\*The difference between the proportion of women at PRCRTC and BIOTECH is significant at  $p = .01$ .

## Summary and Conclusions

Women's participation in agricultural research has increased markedly in the Philippines over the past two decades. Today, it is estimated that women represent approximately 50% of the professionals in public-sector agricultural research organizations. This trend reflects the overall increase in the participation of Filipino women in science, which is among the highest of any country in the world.

Several key factors help explain this high level of participation: increased educational opportunities for women and emphasis on science in the curriculum, economic and social incentives, the relative gender neutrality of science, the relatively lower status of science compared to some other professions such as law and engineering, and access to research jobs in government and universities, which tend to provide more hospitable, flexible, and nondiscriminatory working environments for women.

Opportunities for women in agricultural research increased in the mid-1970s to mid-1980s when the Philippine government and foreign donor agencies gave high priority to agricultural research to fuel economic development. The expansion of disciplines considered important for agricultural research also opened new opportunities for women. Women are more strongly represented in the support disciplines, social sciences, and extension-related fields than they are in traditional, production-oriented agricultural disciplines, such as agronomy or plant breeding, which have traditionally been dominated by men.

Evidence from our study was contrary to several of our expectations about work-family conflicts and attrition. For example, while women do have more work-family conflicts than men, these conflicts do not affect the retention of married women differently than the retention of men: their lengths of service equal those of men and single women. Women's rate of participation in public-sector agricultural research is high, in part because their attrition is low. Women scientists and professionals in the Philippines do not leave their jobs when they have children. To the contrary, child care and family responsibilities appear to be an important factor leading to their retention in public-sector jobs, which offer the stability, flexibility in time management, and supportive policies that allow women to more easily balance family and work responsibilities.

With the stagnation in salaries in the government sector since the mid-1980s, women appear to have been replacing men in the public sector. Our data suggest that men have been leaving for better salaries and career opportunities in the private sector and abroad. This has resulted in women making up a larger share of the agricultural research professionals in government and academe. While women face little overt discrimination in the public sector, significant obstacles remain for women in the private sector.



## **4. Women in Senior Scientific and Management Positions in Agricultural Research in the Philippines**

Reports from industrialized countries indicate that women scientists are promoted at slower rates than men and are underrepresented in senior positions. For example, Zuckerman (1991, p. 37) reports that in the United States,

[g]ender differences in advanced ranks . . . are most accentuated in the major research institutions [where] the higher the prestige of the institution, the lower the proportion of women in full professorships and the smaller the proportion of women assistant professors who are promoted to associate professorships.

Women also lag behind men in promotion in private laboratories where

[f]emale PhD's have traditionally been overrepresented in basic research but underrepresented in management of research and development, as compared with male PhD's. (Northrup 1988, p. 47)

To investigate the participation of women in senior scientific and management positions in the Philippines, we considered the proportion of women in these positions, along with their educational achievement, publication rate, research discipline, and job mobility.

### **Women's Representation in Senior Positions**

Survey data on the grade levels and titles of professional staff showed that the institutes in the study did not share a common grade classification scheme; we also found wide variation in the job titles the institutes used. In lieu of common grades or titles, we used two other measures to analyze the level of staff. First, we estimated a position level by matching grade and title, thereby assigning a junior, middle, or senior level to the staff in each institute. We did not distinguish between science and management in these levels (i.e., senior level = senior scientist or senior manager). Study-team members in each institute validated our position-level estimates. Quantitative data were subjected to statistical analysis to test for the significance of the differences observed between men and women.

The results of this method indicate that women occupy lower positions than men: more women occupy junior-level positions than men, and men are twice as likely as women to hold senior-level positions (table 4.1). While more than three-quarters of the women with BSc degrees are in junior positions, fewer than 60% of the men with BSc degrees are in junior positions.

We used a second method to look at the representation of women in management; here, we used data from the survey on the amount of time spent on management tasks reported by each professional. The results of this analysis indicate that women spend less time on management than men (table 4.2).

**Table 4.1 Percent Distribution of Men and Women across Position Levels**

Position level	Women (N=160)				Men (N=136)			
	BSc	MSc	PhD	All	BSc	MSc	PhD	All
Junior	62%	25%	6%	43% *	46%	23%	4%	32% *
Middle	32%	55%	0%	37%	32%	43%	0%	29%
Senior	6%	20%	94%	20%	21%	35%	96%	39%

\* The difference between the proportions of men and women occupying junior level positions is significant at  $p = .005$ .

**Table 4.2 Time Spent on Management Tasks by Men and Women**

Time on Management	Women (N=160)				Men (N=136)			
	BSc	MSc	PhD	All*	BSc	MSc	PhD	All*
Less than 10%	90%	79%	53%	82%	80%	75%	48%	73%
10% to 30%	8%	19%	35%	15%	14%	18%	28%	18%
More than 30%	2%	2%	12%	3% *	6%	7%	24%	9% *

\* The difference between the amount of time spent on management by men and women is significant at  $p = .05$ .

Given the high proportion of women in the study institutes, they appear to be underrepresented in senior scientific and management positions. The differences we observed cannot be explained by the more recent entry of women in the Philippines into agricultural science since, as discussed in chapter 3, men and women have the same average length of service in the study institutes. To better understand the differences in participation of women and men in senior positions, we examined four other factors that we suspected were related to career advancement: educational achievement, productivity, status of research discipline, and job mobility.

### **Educational Achievement and Career Advancement**

Although staff promotion schemes differed across institutes, all were based on point systems that largely reflect two requirements: educational achievement and productivity. Respondents agreed that the most important criteria for promotion were an advanced degree and research output in terms of publications and new or improved technology. Respondents felt that without an advanced degree, they would have limited opportunities for promotion. Some respondents thought that women have limited training opportunities, which, in turn, limits their attainment of advanced degrees and their career advancement.

Two respondents summed up what most of the others said about the importance of an advanced degree for promotion:

*When a staff finishes an advanced degree, there is automatic promotion to the next higher rank. (female scientist)*

*Degree level has the greatest effect on promotion. It gives me more opportunity to become a research leader and to earn more points for promotion. (male scientist)*

In the four research institutes studied, the proportions of men and women are statistically equal at each degree level (table 4.3). Thus, differences in educational attainment do not explain why there are more men in senior positions.

**Table 4.3 Staff at Four Research Institutes by Degree Level**

Degree	Female		Male		Total	
	#	%	#	%	#	%
BSc	87	54.4	71	52.2	158	53.4
MSc	56	35.0	40	29.4	96	32.4
PhD	17	10.6	25	18.4	42	14.2

Based on survey data on the length of time since last promotion, we compared the average rates of promotion between tenured men and women with advanced degrees (table 4.4). The data showed that, while men and women with a PhD are promoted at approximately the same rate, MSc-level men are promoted more rapidly than MSc-level women. Compared to men, many women with an MSc degree appear to be stalled in their careers. This is similar to the observation of Zuckerman (1991, p. 39) that in academia in the United States, “the dominant pattern in all cohorts is that a larger share of men are promoted to high rank than women of the same age group, and they are also promoted more quickly.”

**Table 4.4 Average Time (in Months) of Advanced-Degree Holders with Tenure Since Last Promotion**

Degree	Women (N=72)	Men (N=64)
MSc	63.7*	38.3*
PhD	68.4	68.5
All	64.8	50.1

\*The difference between the average time of promotion of MSc. men and women is significant at  $p = .005$ .

We expected that family responsibilities and work-family conflicts of women, discussed in chapter 3, might affect women’s careers; for example, these factors might limit the ability of women to invest their time and effort in advancing their careers. Many respondents thought that family responsibilities delayed women’s promotion because women might be able to devote less time to their jobs, have reduced work output, and have less op-

portunity for training (table 4.5). Other respondents thought that it would not affect women's chances for promotion because women can make up any time lost.

**Table 4.5 Perceived Effects of Family Responsibilities on Women's Opportunities for Promotion and for Training Abroad**

Effects	Cited by Men		Cited by Women		Total	
	#	%	#	%	#	%
<b>Effects on women's promotion</b>	(N=10)		(N=7)		(N=17)	
■ no effect	4	40%	4	57%		47%
■ reduced opportunities	6	60%	3	43%		53%
– reduced by absences	2					
– reduced by reduced training	2					
– reduced by reduced output	2					
<b>Effects on women's training abroad</b>	(N=27)		(N=33)		(N=60)	
■ no effect	2	7%	2	6%	4	7%
■ reduced opportunities	25	93%	31	94%	56	93%
– reduced by donor	5		7		12	
– reduced by institute	2		3		5	
– reduced by government	3		3		6	
– reduced by airlines	2		1		3	
– reduced by personal choice	16		19		35	

\* The difference between the proportion of men and women trained abroad is significant at  $p = .005$ .

Respondents were nearly unanimous in the opinion that family responsibilities had a negative effect on training opportunities for women. While reduced opportunities for training was attributed primarily to the choice women made for family responsibilities over training, most respondents indicated that women in general get less support for training than men. However, our survey data did not show a significant difference between the number of men and women receiving support for training.

Nevertheless, family responsibilities may have an effect on women's opportunities for overseas training. Half of the respondents with children stated that they had forgone a scholarship or opportunity for overseas training because of pregnancy or young children. In the words of one woman,

*When my husband received a scholarship to pursue his PhD in the United States, I stayed home because the children were small then. Then I was offered a scholarship in the United States but I had to forego that because my husband had to come back to the Philippines. (female manager)*

Our survey confirms that married men were more likely than married women to receive their degree abroad (table 4.6).

**Table 4.6 Advanced-Degree Training Locations for Married Men and Women**

	MSc		PhD		All Advanced Degrees	
	Women (N=32)	Men (N=24)	Women (N=11)	Men (N=18)	Women (N=43)	Men (N=42)
Foreign	0%	8%	45%	83%	12%*	40%*
Philippines	100%	91%	55%	17%	88%	60%

\* The difference between the proportion of men and women trained abroad is significant at  $p = .005$ .

The distribution of degree locations is likely due, in part, to a former policy of the government that prohibited women with infant children from training abroad. As discussed in chapter 5, this policy has been recently rescinded.

Respondents thought that women delayed training because of family responsibilities. One respondent summed up the experience of many women we interviewed:

*I lost an opportunity for a scholarship abroad because of the government policy that pregnant women or women with children under two years of age could not leave the country for training. I could have worked it out with my husband and parents to go, but the government prohibited it. As a result, I had to do my graduate studies at the local university. It has taken me much longer because I have had to finance myself and have had work and family responsibilities all during the time I have been studying and writing my thesis. This has caused long delays in my thesis. (female scientist)*

Survey data shed light on this perception (table 4.7). The data show that women are five years younger than men when they start their Master's. This suggests that, contrary to the perceptions of many respondents, women in general did not delay the start of advanced-degree training. In fact, women may have delayed marriage to undertake training. However, a training delay does appear during women's MSc studies since they take longer than men to complete this degree. A subject for further research is whether women interrupted training to marry thereby delaying degree completion. Our data show that differences of ages of women and men starting advanced training and of time to complete training has evened out in PhD studies. This is also counter to the perception of many respondents.

## Publishing and Promotion

Many reports, mostly from industrialized countries, note that the achievements of women scientists, including their productivity and promotion, lag behind those of men. For example, Cole (1987) and Kyvik (1990) found that women publish less than men, and Cole (1987) and Brush (1991) found that women scientists are less likely to be promoted to high academic rank.

**Table 4.7 Average Age at Start and End of Degree Training, Duration of Degree Study of Survey Participants Reporting Married Status**

Degree	Women (N=34)			Men (N=39)		
	Start Age (yrs)	End Age (yrs)	Duration (mos)	Start Age (yrs)	End Age (yrs)	Duration (mos)
MSc	23.7**	28.2	53.5*	28.7**	31.9	37.0*
PhD	29.8	34.2	51.8	28.8	33.1	51.3

\* The difference between the duration of training for MSc men and women is significant at  $p = .001$ .

\*\* The difference between the start age of MSc men and women is significant at  $p = .025$ .

Recent studies explain that the lag in publishing cannot be attributed to marriage and motherhood since married women on average produce more than single women during their careers, and having children does not significantly affect the publication rates of married women (Cole and Zuckerman 1987; Cole 1987; and Kyvik 1990). Other forces, usually attributed to social factors, may be at work to dampen the achievements of women in science. In a study of women in developing countries, Chakravarthy, Chawla and Metha (1988) attribute this lag to social mechanisms operating within professions, which inhibit the commitment of women in science. Cole (1987) discusses invisible colleges that produce opportunity structures that marginalize women. Fox (1991), Gibbons (1992c), and Vidaver (1988) discuss how “good-old-boy networks,” mentoring, and informal communications in laboratories affect women scientists. Cole and Singer (1991, p. 307) refer to the accumulation of small disadvantages from, among other things, sex discrimination and conflicting domestic responsibilities, that lead to “large changes in individual career histories over extended periods of time.”

Reports from the Philippines also indicate that the productivity of women scientists may lag behind that of men. The Philippines Development Plan for Women (National Commission on the Role of Filipino Women 1990) indicates that family responsibilities may have serious repercussions on the output of women scientists.

To investigate this aspect of promotion, we used survey data on the publications of women and men in the study institutes. We found no significant difference between the publishing rates of married women and those of men or single women (table 4.8). If we compare staff at the same degree level, we still find no significant differences between these publishing rates. Thus, we conclude that women in general and married women in particular have publishing rates that appear to be competitive with those of men. These results contrast with studies of the publishing rates of men and women in industrial countries.

The publication output of married women in the study institutes has been maintained in spite of their burden of family responsibilities. In the Philippines, the family responsibilities and work-family conflicts that women experience apparently do not limit their ability to invest time and effort in publishing. Factors other than women’s publishing rate appear to affect their career attainments. These results parallel Cole’s (1987) findings on women’s performance and promotion in science in the United States. He concludes that

**Table 4.8 Annual Publication Rate by Degree Level and Marital Status**

Staff Status and Degree Level		Average Annual Number of Publications <sup>1</sup>		
		Domestic Publications	Foreign Publications	Total Publications
<b>Married Females</b>				
Msc	(N=32)	3.69	0.28	3.97
PhD	(N=11)	3.64	1.36	5.00
All	(N=73)	3.00	0.37	3.37
<b>Single Females</b>				
Msc	(N=15)	4.07	0.40	4.47
PhD	(N=3)	4.00	1.00	5.00
All	(N=33)	3.55	0.27	3.82
<b>All Females</b>				
MSc	(N=56)	3.96	0.32	4.29
PhD	(N=17)	4.35	1.29	5.65
All	(N=160)	3.60	0.29	3.89
<b>All Males</b>				
MSc	(N=40)	3.17	0.15	3.89
PhD	(N=25)	5.28	1.72	7.00
All	(N=136)	3.01	0.48	3.49
<b>All Staff</b>				
MSc	(N=96)	3.64	0.25	3.89
PhD	(N=42)	4.90	1.55	6.45
All	(N=296)	3.33	0.48	3.71

<sup>1</sup>Publications include books, book chapters, journal articles, research reports, research abstracts, extension publications, conference reports or papers, news articles, radio, TV, and video-tape programs, etc.

*[e]ven after I have taken account of many other factors, such as career interruptions and the quality and assessed quality of research performance of men and women, I find that women are still less likely to be promoted to high academic rank. And when they are promoted, it is not apt to happen as quickly.*  
(Cole 1987, p. 364)

In the study institutes, publications are linked to promotion through point systems: the higher the rate of publication, the more points for promotion. These systems are designed to provide objectivity in promotion decisions (factors in addition to publications that also lead to points include, among other things, professional presentations, instructional tasks, and administrative duties). The fact that women publish at a rate equal to men and yet have lower rates of promotion raises questions about the effectiveness of point systems. However, since these systems were adopted only recently, they may not have had enough time yet to make a noticeable impact on promotion patterns.

## **Discipline and Career Attainment**

Job segregation by sex in organizations in industrialized countries is indicated by the clustering of women in lower-status jobs or professional niches (Reskin and Hartmann 1986). This clustering may impede women's career attainments. In agricultural research, it is commonly thought that (1) laboratory-oriented and support disciplines (e.g., biochemistry and entomology) have lower status than field-oriented disciplines (e.g., plant breeding and agronomy), particularly in research organizations aimed at technology development, and that (2) women in general prefer lab to field work. Drawing on this argument, we expected that women scientists in the Philippines would cluster in laboratory-oriented and support disciplines, which would make it more difficult for them to advance into senior scientific or managerial positions. Our study investigated three lines of evidence concerning this issue: clustering of women in disciplines of degrees awarded by UPLB and VISCA and in disciplines found in our study institutes, respondents' views about discipline status, and survey data about the time spent by men and women in laboratory and field assignments.

Data from UPLB and VISCA, summarized in chapter 3, show that a smaller portion of women than men are awarded MSc degrees in the traditional field-oriented disciplines of plant breeding, agronomy (plant production), or animal production. Women are more likely than men to receive degrees in support sciences, such as entomology and social science. Looking at the study institutes, our survey data show women well integrated into some but not all of the traditional field disciplines. For example, women comprise half of the agronomists but only 18% of the plant breeders (table 4.9).

**Table 4.9 Gender Composition of Major Disciplinary Fields Represented in Four Case-Study Organizations (N=285)**

<b>Discipline</b>	<b>Total number scientists</b>	<b>% women</b>
Plant breeding	50	18
Plant production	33	50
Plant protection	46	52
Soil science	23	52
Agricultural engineering	22	27
Basic and support disciplines	77	70
Social sciences	17	76
Food and nutrition	17	82
Total	285	46

Using survey data, we categorized staff disciplines as field or lab/support and compared the gender composition and position levels between the two categories (table 4.10). While the proportion of men in field disciplines was significantly higher than the proportion of women in these disciplines, there was no significant difference between the proportion of senior staff in field disciplines and those in lab/support disciplines. Thus, men were more likely than women to be in a field-oriented discipline, but senior staff were as likely to be in



a lab/support discipline as a field discipline. Apparently, disciplinary orientation does not affect position level.

**Table 4.10 Gender and Position-Level Composition of Field and Lab/Support Disciplines**

Disciplines of staff <sup>1</sup>	Gender Composition (%)		Position-Level Composition (%)	
	Women (N=160)	Men (N=136)	Senior (N=85)	Junior/Middle (N=211)
Field disciplines	20.0*	38.2*	34.1	26.1
Lab/support disciplines	80.0	61.8	65.9	73.9

<sup>1</sup>Field disciplines include plant breeding, plant production, and animal production; lab/support disciplines include engineering, animal health, basic science, food/nutrition, management, natural resources management, plant protection, socioeconomics, and soil science.

\*The difference between the proportion of men and women in field disciplines is significant at  $p = .005$ .

Respondents were asked their perceptions of the gender balance and field or laboratory orientation of different disciplines, and prospects for promotion in these disciplines (table 4.11).

**Table 4.11 Respondents' Perception of the Field/Laboratory Orientation, Gender Composition, and Promotional Opportunities of Agricultural Disciplines (N=60)**

Discipline	Lab/Field Oriented <sup>1</sup>	Gender Dominance
<b>Disciplines with good promotion opportunities<sup>2</sup></b>		
Biotechnology	Lab oriented	Balanced male-female
Genetics	Lab oriented	Female dominated
Plant breeding	Field oriented	Male dominated
<b>Other disciplines</b>		
Biochemistry	Lab oriented	Balanced male-female
Biology	Lab oriented	Balanced male-female
Chemistry	Lab oriented	Female dominated
Food technology	Lab oriented	Female dominated
Information/computer	Lab oriented	Balanced male-female
Mathematics/statistics	Lab oriented	Balanced male-female
Soil chemistry	Lab oriented	Balanced male-female
Agroforestry	Field oriented	Male dominated
Agronomy	Field oriented	Male dominated
Animal breeding	Field oriented	Male dominated
Forestry	Field oriented	Male dominated
Animal nutrition	Mixed lab-field	Balanced male-female
Natural resource management	Mixed lab-field	Balanced male-female
Plant pathology	Mixed lab-field	Balanced male-female
Social sciences	Mixed lab-field	Female dominated

<sup>1</sup>Disciplines that 50% of respondents indicated as having a specific orientation.

<sup>2</sup>Disciplines that 50% of respondents indicated as having good promotional opportunities.

The results show little perception of gender dominance in the laboratory sciences; however, disciplines that are viewed as field oriented are also viewed as male dominated. While women are, in fact, integrated into most disciplines, the stereotype remains that they are underrepresented in disciplines that are perceived as strongly field oriented. Contrary to our expectation, disciplines thought to be good for promotion included genetics, which is also viewed as female dominated, and biotechnology, which is viewed as balanced male-female.

We further explored the relationship between discipline and gender by asking respondents to identify outstanding women agricultural scientists in the Philippines and their disciplines. Among the 115 citations, the three disciplines that appeared most often were entomology (23% of citations), social science (18%), and plant breeding (11%). Thus, women in the Philippines are recognized as excelling even in stereotypically male disciplines.

Considering the relationship between promotion and field or laboratory orientation, we looked at survey data on the amount of time that men and women reported they spent in either field or office locales (table 4.12). Contrary to expectations, we found no significant difference overall between the time that women and men spent in the field.

**Table 4.12 Average Percent Time Spent at Work Location (N=257)**

Location	Station	Office			Field		
		Men	Women	Total	Men	Women	Total
Central	BIOTECH	87.6	93.0	91.5	10.5	6.1	7.4
	IPB	45.5	55.2	49.8	29.8	20.3	25.6
	BIOTECH & IPB	63.0	81.5	74.2	21.8**	10.5**	14.9*
Outlying	PHILRICE	60.6	54.7	57.9	39.6	45.3	42.2
	PRCRTC	74.9	75.0	74.9	17.7	25.0	20.4
	PHILRICE & PRCRTC	63.7	58.2	61.3	39.4	41.8	37.9*
	ALL	63.4	72.3	68.1	29.2	22.8	25.8

\*The difference between the time spent in the field by staff in outlying stations and central stations is significant at  $p = .001$ .

\*\*The difference between the time spent in the field by men and women in central stations is significant at  $p = .005$ .

The amount of field work done by women may reflect more an institute's location than a gender characteristic. Staff in outlying stations spend more time in the field than their central-station counterparts, and women in isolated stations do as much field work as men. In more centrally located stations, BIOTECH and , men spend more time than women in field work. Overall, there is no difference in the time men and women spend in the field; therefore, it is unlikely to be a major factor contributing to differences in career attainment.

In summary, there is little evidence of job segregation by sex in terms of discipline within the study institutes. Although some disciplines remain stereotyped as male or female dominated, these do not appear to be consistently correlated with either opportunities for promotion or with field or lab orientation as we had expected. Most disciplines were re-

garded as having similar opportunities and a balanced gender composition. While plant breeding remains male dominated and is still widely regarded as offering good opportunities for promotion and scientific recognition, the association between opportunity and gender composition of a disciplines is more the exception than the rule. We conclude, therefore, that career attainment of women is not strongly affected by their discipline.

## **Job Mobility and Career Attainment**

Several studies of potential constraints to career attainment of female scientists in the United States have concluded that women's lower geographic mobility is a key factor explaining their lower career attainment compared to men. Impediments to changing location may reduce career options and, thus, limit women's career development more than that of men. As discussed in chapter 5, our study and others have shown that women scientists tend to cluster in metropolitan areas (where there are more career options for their spouses) more than men do, to be less likely than men to change geographic areas when they change jobs, and to be more likely to adjust their careers to accommodate those of their spouses (Cole 1987; Marwell, Rosenfield and Spilerman 1979; Northrup 1988; Zuckerman 1990).

Women scientists are typically more likely than men to have a professional spouse with an independent career (Centra 1974; Marwell, Rosenfield and Spilerman 1979). A study of male and female PhD holders in the USA found that 63% of the women had spouses who held professional degrees, compared to only 8% of the men. The same study also found that 49% of the married women surveyed, compared to only 4% of the married men, viewed their spouses' jobs as a major deterrent to considering positions in other locations (Centra 1974). Women's lower geographic mobility may inhibit their ability to maximize career opportunities through job relocation.

Married and single women [scientists] are less mobile geographically than men, and married women say that decisions to move are affected by their family obligations. Since promotion and pay increases are often tied to a change in employment, women's limited geographic mobility, may, in part, account for gender differences in career attainments. (Zuckerman 1992, p. 52)

Given the attention of other studies to mobility and career attainment, we examined this factor as a possible explanation for women's lower career attainment in the Philippines.

### **Mobility**

We asked respondents about their job mobility (broadly defined as changing jobs between organizations or changing the location of work, such as outposting to a field station or travelling to isolated field locations). Most respondents considered single men and women to have the same level of job mobility, but important differences were seen among married men and women professionals. The majority of respondents perceived married men to be more mobile than married women. These differences were explained primarily in terms of men's and women's accepted roles within the family and society. Since men are viewed as heads of families and primary breadwinners, they are more motivated or under more pressure to change jobs and to either relocate or commute in order to earn higher salaries and advance their careers. Respondents thought that men primarily move to new opportunities in the private sector where they are hired in preference to women.

*Married men are more mobile because they are head of the family and have pressure to earn the first income. Hence, they are always on the lookout for a better-paying job. They usually go to the private sector. (female manager)*

*Men tend to move on to seek new jobs for economic reasons; sometimes they look at salary first and science second. (female manager)*

*Married men are more free to move; our society does not accept women to be so mobile. The norm allows men to change jobs easily, which is unfair, a sort of double standard. (male scientist)*

According to Philippine norms and values, married women have primary responsibility for child rearing and managing the household and, consequently, are less mobile than men. Respondents in our study perceived married women to be more motivated than men to stay in one organization in order to maintain their support structures so that they could balance work and family responsibilities. Twice as many women respondents ( $N=24$ ) compared to men ( $N=12$ ) cited family responsibility as the main factor causing women's lower mobility.

*Married women are left to take care of the family while men go to seek new jobs elsewhere. Women tend to stay in the same job very much longer because they have to establish stable schooling for the children and keep a household where the men can come back to. (female scientist)*

Our interview data indicated that men have stronger economic incentives for job relocation, whereas women, who have primary responsibility for the family, have stronger incentives against relocation. As was discussed in chapter 3, these different incentive structures for men and women appear to be a major factor explaining why women predominate in public-sector agricultural research organizations in the Philippines where there may be less demand for mobility than in the private sector. Men's greater mobility appears to give them advantages in career attainment, especially in seeking higher-paying jobs in the private sector.

However, the survey data paint a somewhat different picture: the relocation histories of men and women in the study institutes do not show significant differences between in terms of job mobility. When we compare the number of men and women who had been employed in an organization outside the environs of their current employer (i.e., requiring geographic relocation), we see no significant differences between the mobility patterns of men and women. The data reflect individuals who have chosen to stay in the public sector.

### **Dual Careers**

In families where both husband and wife are professionals, often both are pursuing a career. Women and men in such dual-career families must often juggle schedules and compromise opportunities in order to maintain their careers as well as their families (Gibbons 1992b; Guzman and Estuara 1991). Following this line of reasoning from studies in the United States, we wanted to see if conflicts with spouses' careers was another factor contributing to women's reduced mobility. As was found by Marwell *et al.* (1979), our survey data showed

that a higher percentage of married women than men were in more centrally located institutes, where there would be job opportunities for spouses (also see chapter 5).

Our survey data showed no significant difference between the proportions of married men and women in the study institutes (74% and 69%, respectively). Interviews indicated that a higher percentage of women than men professionals had spouses who were also professionals. Among our respondents, 81% of the married women ( $N=26$ ) had spouses who were professionals, compared with 50% of the men ( $N=22$ ). This is similar to the pattern found in the United States. In the Philippines, many of our respondents in dual-career families reported that their spouse was employed in the same organization, for example, at a sister institute in the university (58%).

When we asked about how their spouses' careers had affected their own, considerably more women felt their careers had been negatively affected by their spouses' career than did men. Of all married men, 14% said their careers had been negatively affected by their spouse, compared to 42% of the married women. Examples of negative effects included delayed or uncompleted graduate-study programs, lost opportunities for jobs or in-service training, and termination of employment or choice of less desirable employment in order to accompany a spouse who was relocating.

*I had to give up a good job in the United States to follow my husband when we returned to the Philippines when he completed his studies. (female scientist)*

*Once my husband and I were offered a job together [with a private company in another location]; the offer to him was good but my offer was at a much lower salary; I did not accept the offer and my husband rejected his offer because of my decision. (female manager)*

Reports of the positive effects of dual careers included complementary disciplines, moral support, encouragement, and understanding. In the words of one respondent,

*My husband's career enhanced mine. He encouraged me to take up a PhD when the children were grown. And I helped him in developing his career because I did not go to school when he was taking up graduate studies. Instead, I stayed home with the children. (female manager)*

The complex and dynamic mobility patterns exhibited by scientists affect individual careers as well as institutes, which adopt strategies for staffing their research organizations. One recruitment strategy, discussed in chapter 5, is the "package deal" in which jobs are provided for both the husband and the wife so that the family can relocate together. At the same time, respondents indicated that joint decisions and compromise by husbands and wives about relocation are now more common in the Philippines than they were in the past.

*As women attain higher levels of education and have their own careers, they are becoming more assertive about their mobility. (female manager)*

*When we relocated to this new institute, my husband and I discussed the move and we decided together. But tradition still expects that women should compromise more if there is conflict. (female scientist)*

Although the results of our investigation of job mobility and career attainment are inconclusive, we found that, as in the United States, women scientists in the Philippines are more likely to have professional spouses than men, that wives' mobility may be more restricted than husbands' mobility in dual-career families, and that family obligations and spouse's employment were cited by respondents as principal reasons for women's lower job mobility. Men's greater job mobility appears to give them advantages in career attainment, particularly in finding higher-paying jobs in the private sector. It also appears to be a key factor explaining the higher percentage of women in public-sector research organizations.

## **Summary and Conclusions**

Women professionals in the Philippine research system appear to be underrepresented in senior scientific and management positions: there are twice as many men in senior positions as women, and 10% of the managers are male, compared to 3% female. At the same degree level (MSc), men are promoted faster than women. Tenured women seemed stalled in their careers, and neither educational attainment nor research output explain this discrepancy.

Women are more likely to be found in laboratory-oriented disciplines and men in field-oriented disciplines. However, most disciplines are perceived to have a balanced male-female composition, and there does not appear to be any difference in the opportunities different disciplines provide for career attainment. Contrary to the perceptions of respondents, our survey data show no overall difference between men and women in terms of time spent in the field. In fact, the time spent by men and women in field locations appeared to be more an effect of the institute's location than a gender characteristic.

Women experienced more work-family conflicts than men. However, these did not seem to affect their research output: married women publish at the same rate as married men, single women, or single men. This is contrary to the findings of many studies of publishing rates in industrialized countries (e.g., Cole and Zuckerman 1987; Cole and Singer 1991; Kyvik 1990). Work-family conflicts do, however, constrain the ability of women to pursue opportunities for training, and this probably has a negative impact on women's careers.

The factors discussed in this chapter (degree level, publishing rate, research discipline, and mobility) do not explain the differences in the position levels of men and women that we observed in the study institutes. There is scope for a more in-depth study of the possible factors affecting the advancement of women in these organizations.

Cole and Fiorentine (1991) discuss three broad categories of the possible causes of inequality between men and women in science: biological, structural, and cultural. They find no evidence linking biological differences with differences in achievement of men and women in science. Structural causes refer to the way institutions are organized and operated. They account for how differences in attainment by men and women arise when, for example, an organization uses the sex status of an individual to determine his or her position or his or her rewards. In the Philippines, the rule against granting training abroad to women with young children is an example of a structural cause for differences in the career attainments of men and women. As mentioned earlier, this cause has been removed, although respondents indicated that some donors still maintain this practice. However, since the rate of pro-

motion is slow in the research institutes and this revision in the training policy is recent, it may be some time before the results of removing this structural barrier become evident in career-attainment patterns.

Culture is the third category causing inequality. For Cole and Fiorentine, cultural causes are internalized beliefs, attitudes, norms, and values that influence decisions by individuals. The constraining nature of culture is expressed by individual choices regarding particular goals or attainment. According to these authors, culture influences women's attitudes about employment goals; having a job that is compatible with their family role as mother and wife has traditionally been more important than high career attainment. It is

culturally defined gender values which continue to explain the still lower levels of occupational achievement of women compared with men. (Cole and Fiorentine 1991, p. 223)

Cultural values in the Philippines strongly influence women's choices about their careers. Many women reported they had foregone training opportunities by choice. Further, when asked if women were as interested as men in moving into management positions, 45% of our respondents (N=38) indicated no:

*Fewer women are interested because they have family responsibilities. (female manager)*

*Men are more interested. There are fewer women fighting for positions. Women see management positions as more demanding in time and managing people. Women must take care of their families; it is the expected role; they cannot pass it on to others. (male scientist)*

Cultural values also influence the perceptions of senior managers, who are largely male, on the suitability of women for top management positions. Here gender stereotyping of feminine traits and appropriate roles for women in the Philippines works against women moving into high-level positions.

Culturally influenced choices about career goals and perceptions about suitability for advancement may explain, at least in part, the different patterns of career attainment of men and women. We discuss further the effects of culture on the institutes in chapter 6.

Whether from structural or cultural causes or both, the resulting broad patterns of different career attainment by men and women suggest that a segment of the work force is in a position, since with the same level of training and output, women's career attainment is lower than men's. Managers in the institutes need to consider ways of stimulating attainment among all segments of their work force in order to assure the efficient use of their available resources. In chapter 5, we discuss the issues that managers in the Philippines face and their responses to these issues.





## **5. Management Issues and Responses and the Increase in Numbers of Professional Women**

Increasing numbers of women in traditionally male-dominated scientific organizations bring challenges to the management of human resources. Established policies, practices, and behaviors may result in the suboptimal use of women scientists and managers in these organizations. Evidence of suboptimal utilization could include observations about the attrition, career development, salaries, and productivity of women scientists and raises questions about policies and practices concerning, among other things, recruitment, leave, and promotion. Scientific organizations may need to adjust their management policies and practices to maximize the use of their professional female resources.

Our study investigated how the increase of professional women in these types of organizations affects the issues that managers have to deal with. We also examined the management policies and practices developed in response to these issues. Drawing on the literature from industrialized countries, we examined policies and practices in five areas: (1) recruitment in isolated locations, (2) maternity and employment, (3) family responsibilities and career development, (4) flexible hours and job sharing, and (5) equal pay. In particular, we sought to explain the management issues and responses associated with dual-career families by investigating the incidence of dual-career families, patterns of marital status among institutes, and policies and practices for spouse employment.

### **Recruitment in Isolated Locations**

As discussed in chapter 4, most women scientists in the study institutes belong to dual-career families. Like women in dual-career couples in industrialized countries, women in the Philippines face constraints in maximizing their career prospects.

Reports from the United States show that academic women are more likely than academic men to work in large metropolitan areas (where there are career options for spouses) and less likely than men to change geographic areas when they change jobs (Marwell, Rosenfield and Spilerman 1979). Scientific organizations are challenged by dual-career families in a number of ways. For example, laboratories in the United States face a disadvantage recruiting scientists who belong to dual-career families, especially if a laboratory is in an isolated location (Northrup 1988; Zuckerman 1991). Staff from dual-career families feel constrained in shifting job locations, and women feel more constrained than men (Cole 1987) because location preference plays a greater role in the job search of women than men (Northrup 1988). To accommodate dual-career staff in scientific organizations, some suggested management policies and practices include provision for flexible working hours, "family care" leave, subsidized day-care for staff children, and positions in the organization for professionally qualified spouses (Brush 1991).

Comparing staffing patterns in locations closer to major labor markets (*central locales*) and those farther away (*outlying locales*), we found that women were more concentrated than men in central locations (table 5.1). In particular, married women were more likely than married men to be found in central stations; married men were more concentrated in the outlying stations.

**Table 5.1 Location of Staff Reporting Marital Status**

	Central Locales: PHILRICE Los Banos, IPB, and BIOTECH (N=134)			Outlying Locales: PHILRICE Maligaya & Mindanao, and PRCRTC (N=73)			Total Staff (N=207)		
	Women (%)	Men (%)	Total (%)	Women (%)	Men (%)	Total (%)	Women (%)	Men (%)	Total (%)
Married Staff	43**	26**	69	20	55**	75	35	36	71
Single Staff	17	13	31	14	11	25	16	13	29
Total	60*	39*	100	34	66	100	51	49	100

\*The difference between the proportions of men and women in central locales is significant at  $p = .001$ .

\*\*The difference between the proportions of married men and married women in central locales is significant at  $p = .001$ , and the difference between the proportions of married men in central and outlying locales is significant at  $p = .001$ .

Respondents explained that women are likely to locate in central stations because many have husbands employed in central locales or have children in school there. At the same time, men may take a position in an isolated location because their traditional role as breadwinner permits greater mobility in order to exploit job opportunities.

Managers in our study reported that recruitment policies and practices in their institutes have been affected by the fact that most professional staff belong to dual-career families. For example, a formal and rare exemption to a government policy prohibiting nepotism was made for scientific staff in the Philippine NARS. This exemption allows husband and wife to be employed in the same institute. Managers reported that it facilitates recruitment.

Exploiting this exemption, some institutes have recruited married couples in a “package deal.” The practice of recruiting husband and wife teams appears to be more common at the institutes that are farther from a large labor market. It was mentioned by 16 of 29 respondents at the more outlying stations (PHILRICE and PRCRTC) but only by two of 35 respondents in the more central stations (IPB and BIOTECH). However, many respondents at IPB and BIOTECH reported their spouses were employed by sister institutes at UPLB; this may have obviated the need for package deals at these institutes.

The package deal typically includes employing both spouses, who are hired at levels commensurate with their background and training, and covering moving expenses and housing. In some cases, it includes the opportunity to study abroad for both husband and wife. It was also reported that package deals had been provided for couples before marriage.

Among the benefits reported by institutes providing package deals is that they enable the institute to attract staff who prefer to be located where both spouses can be employed. It

also increases stability and the retention of professional staff. In the words of one male scientist:

*Husband and wife teams are good for the institute because the senior staff is more stable. Many of the staff who were recruited on a package deal are still here today. When staff got married their spouses were also offered jobs. Husband and wife teams were also encouraged to study [in the Philippines] and abroad by giving them a scholarship at the same time. This encouraged staff to stay longer. (male manager)*

Package deals were also reported to improve morale and help lower the cost of institute-provided housing under the principle that two can live more cheaply than one. In deals that include study abroad, it was reported that these individuals are more likely to return to the institute upon completion of study.

Such deals are not, however, without their negative aspects. For example, difficulties were reported when one member of the couple was better qualified, when both husband and wife aspired to management positions, or when one was the supervisor of the other. Respondents thought that package deals work better if spouses are in different disciplines and therefore not directly competing with one another, and it is better if they are in different units or centers than in the same unit or program. One manager pointed out that package deals work best if one party is in an administrative track and the other is a scientist since better separation of responsibilities minimizes competition. Several managers reported that they would not permit a direct reporting relationship between parties of a package deal. In addition, some single staff members complained of the preference in housing offered to couples.

At one institute, two women respondents, who had been given package deals, explained that their husbands used to work there as well but found it difficult to work in the same institute. The careers of the women had advanced more quickly than those of their husbands. The men had changed jobs and moved to other locations.

In summary, the institutes in the study were similar to scientific organizations reported in industrialized countries in that their staff tend to belong to dual-career families. Because married women tend to concentrate in central locations, the policies and practices of the more outlying organizations have had to be adjusted in order to attract and retain married scientists. These adaptations have brought both benefits and problems for managers. The benefits include achieving recruitment targets, increased retention, and improved morale. Problems include, among other things, possible competition between spouses. The proper placement of spouses within the organization is essential but cannot assure the success of husband and wife teams.

## **Maternity and Employment**

Our study sought to explain the responses of Filipino scientists and managers to the issues of family responsibilities and career development. We investigated how institutes encourage women to remain employed. In specific, we collected data on policies and practices regarding maternity leave, support in balancing work and family responsibilities, and promotion.

As noted in chapter 3, one important finding of our study is that professional women do not leave the Philippine research organizations once they start having children. Indeed, having a large number of women in the institutes does not lead to higher levels of attrition. We also found that having children may actually increase the retention of women scientists in public-sector institutes in the Philippines.

As our male and female respondents indicated, women with children remain employed primarily for economic reasons (table 5.2). However, women were more likely than men to recognize additional reasons for women returning from maternity leave to the institutes, such as enjoyment of work, dedication to career, and contract obligations.

**Table 5.2 Factors Attributed to Women's Return from Maternity Leave**

<b>Factor</b>	<b>% Men Citing the Factor (N=30)</b>	<b>% Women Citing the Factor (N=34)</b>	<b>Total (%) (N=64)</b>
Economic	63.3	70.6	67.2
Enjoy work	13.3	29.4	21.9
Dedicated to career	13.3	26.5	20.3
Effect of absence on others	6.7	2.9	4.7
Contract or civil-service obligations	13.3	23.5	18.8
Availability of help at home	6.7	14.7	10.9
Health of mother or child	10.0	11.8	10.9

We found policies and practices that enabled women scientists and managers with families to remain productively employed in the laboratories. Respondents indicated that maternity leave is the principle policy that deals specifically with family issues. Maternity leave in the Philippines is much more generous than the norm for organizations in many industrialized countries, such as the United States. The maternity policies of the institutes of the study permit two months with pay and one month without pay for tenured staff. Regulations for untenured (contract) staff appear to vary between institutes, with some granting one month of unpaid leave and others granting one month paid leave (25% of the women in our survey were untenured). A recent policy designed to cope with absences is that women who return early from maternity leave get reimbursed in cash for days not taken. Most women indicated, however, that this is an incentive only for those in real financial need; most women take the full leave. In addition, one institute is considering permitting fathers one month paternity leave in recognition of the dual-parenting responsibilities of their staff.

Informal practices reported at several institutes allow women to take extra time for maternity or when their children are infants and to make it up through overtime work at night or on weekends. In addition, some project leaders provide more flexibility by allowing women to take their work home. Thus, the ample leave policies and flexible practices in the Philippine institutes support women having children.

Women scientists and managers indicated that they can usually organize their work so that there are no major disruptions while they are away. Women set up their projects and

then delegate responsibility to their research assistants. This is an important coping strategy and one advantage of being a researcher. Sometimes coworkers also assist or take over the work during an absence. Managers may use this practice less than scientists since their work may not be as easily delegated. Nevertheless, managers and scientists did not perceive maternity leave as highly disruptive or costly because there are ways of coping with it.

Social networks of Filipino communities also support professional women with maternal responsibilities. The family was often mentioned as the basis of this support; help from husbands, parents, in-laws, and siblings was cited by most of the married women in the study. The importance of hired help (e.g., maids and baby sitters) was also mentioned, but respondents indicated that such help is becoming increasingly scarce as Filipino casual labor moves to opportunities in urban centers and abroad.

In summary, women scientists and managers with family responsibilities tend to remain employed in the Philippines; higher numbers of women have not led to higher attrition. The institutes and staff have developed ways to cope with absences due to maternity, and these coping mechanisms appear to be successful for both the women and the institutes. Women are able to organize themselves and their coworkers so that research is not interrupted, and project leaders have been flexible, allowing women to find ways of coping with the constraints of family responsibilities. A fixed and supportive maternity policy allows women to have their babies and then return to work on schedule.

### **Family Responsibilities and Career Development**

As discussed in chapter 4, respondents were nearly unanimous in saying that family responsibilities had a negative effect on opportunities for training. This was due in part to a previous government regulation that prohibited granting training abroad to women who were pregnant or who had children under two years old. This policy was recently reversed by the National Economic Development Authority (NEDA), which manages training assistance funds; the current policy makes training funds available to all women. Through this change, the policy removed barriers to training opportunities for women with maternal responsibilities. However, many respondents indicated that some donors still maintained such barriers.

The advent of point systems for promotion in the study institutes (see chapter 4) was thought to benefit staff with family responsibilities by recognizing output over attendance. Output achieved at home or after hours, when family responsibilities conflicted with work schedules, is given full credit in the point systems. Although we did not obtain data on points that had been achieved by staff, our respondents indicated that the system does not favor either men or women; it is gender neutral. However, some women reported that they had to, or were asked to, reduce the number of projects they worked on when they were pregnant or had small children and that this led to fewer points.

### **Flexible Hours and Job Sharing**

Women scientists with families may lose discretionary time, such as the flexibility to stay late in the laboratory (Cole and Zuckerman 1987). To manage their busy schedules, women scientists with families must rely on some form of child care or household help (Cole and

Zuckerman 1987). Laboratories in industrialized countries are trying to help ease the work-family crunch of their married staff by implementing creative programs such as on-site day care, flexible scheduling, lengthy leaves, and job sharing (Culotta 1993b; Amato 1992). Women scientists in the Philippines call upon a variety of support systems to help balance their sometimes conflicting responsibilities to work and family, often relying on household help. But sometimes this is not enough.

Most middle-class Filipino households employ live-in helpers, and when those helpers are not available, the female scientist has few options to fall back on, since organized day care is uncommon in the Philippines, and relatives, though supportive, often live some distance away. (Vitug 1994, p. 1492)

We examined the management issues and responses associated with policies and practices to ease the work-family crunch in the Philippine institutes. To do this, we investigated, among other things, work scheduling and the incidence of job sharing in the study institutes.

Work-schedule adjustments—both formal and informal—were cited frequently as a way of coping with such conflicts.

### **Formal Leave**

Vacation leave, sick leave, and leave without pay were cited as frequently used means to accommodate work-family conflicts. In the Philippines, civil-service rules allow sick leave for the care of sick family members. However, data on the leave applications of married staff during 1992 at one institute show that, unlike men, women used more vacation leave than sick leave (table 5.3). This appears to confirm reports by respondents that women tend to use vacation leave to cope with family responsibilities, but it is contrary to interview data from respondents about women's use of sick leave to care for sick family members. Data on the incidence of leave without pay were not available.

**Table 5.3 Number and Types of Applications for Leave by Married Staff in BIOTECH, 1992**

<b>Leave type</b>	<b>Married Men (N=11)</b>	<b>Married Women (N=40)</b>
Annual leave	58.5	330.5*
Sick leave	58.0	182.0*
Total	116.5	512.5

\*The difference between the proportion of annual leave and sick leave applications by women is significant at  $p = .005$ .

According to respondents, the leave requests in cases of work-family conflicts were typically accommodated by research managers. In the words of one scientist,

*When women with young children have to take a leave of absence because a child is sick, it is always approved by management. (female scientist)*

Managers need to assure continuous coverage of institute activities. In the study, we found that responsible managers make sure that more than one individual can do crucial tasks and that activities are covered at all times. Managers stress team work, staff members support one another, and substitutes are prepared for the eventuality of absences. Preparations include cross-training other scientists or subordinates in tasks in addition to their own and assuring that they are assigned as substitutes to cover the tasks of absent staff.

### **Job Sharing**

Job sharing is the practice of more than one individual occupying the same position on a part-time basis. The practice of leave coverage can be viewed as an example of informal job sharing. The staff members involved do not formally occupy the same position, but they do fill in on a part-time basis. Informal job sharing is supported by cross-training (the practice of training staff in several tasks so that any task can be performed by more than one person) and by assigning responsibility to cover jobs during staff absences. Some respondents thought formal part-time jobs (e.g., a formal job half-time) could help married women balance responsibilities between home and work; however, we did not find any examples of such jobs at the study institutes.

### **Informal Absence**

Informal absence, such as tardiness, was widely reported in the study. Attempts to discourage such absences using a variety of tactics were also commonly reported in the institutes. Tactics included positive sanctions such as using attendance as a criterion for annual performance awards, negative sanctions such as demerits for tardiness, and increased watchfulness for informal absence. As an example of the latter tactic, one institute used a sign-in sheet, and a time clock was under consideration at two institutes. In the words of one respondent,

*Being strict about attendance causes solutions to be found; for fear of losing their jobs, women are solving their family problems by getting relatives to help out; but [the institute] must be humane. (female administrator)*

Informal absence was also accommodated in several ways. One means was informal job sharing to assure coverage of research activities during such absences. An interesting example this was reported at one institute, where female staff covered for male staff who were late or absent on occasion because they had long commutes to see their families week-ends; male staff covered for female staff who were late or absent on occasion because of problems at home, such as sick children. Managers at all of the institutes compensated for informal staff absences by allowing staff to take work home or to work overtime. In the words of one respondent,

*We can do overtime to cover lost time and colleagues usually take over if the job needs to be done immediately. (female scientist)*

The issue of staff absences is associated with more than work-family conflicts. Respondents in the study indicated that the issue cuts across gender and civil-status lines, and ISNAR has found the same problems in institutes in countries with few women scientists



and managers. Apparently even with successful policies and practices to address work-family conflicts, institutes may find that staff absences remain an issue.

### **Flextime**

The government of the Philippines allows flextime—prearranged, alternating schedules for starting and finishing work—especially in metropolitan areas to alleviate rush-hour traffic problems. We discussed with respondents the possibility of using flextime to help staff solve family scheduling problems such as conflicts with school schedules. However, the respondents indicated that flextime would not solve conflicts with school schedules and could create problems for institute operations. The conflict between work and school schedules is compounded by the social norm that requires a responsible family member to deliver and collect small children at school. This entails up to a three-hour gap when schools are closed but offices are open, for example, from 11.00 to 12.00 and from 15.00 to 17.00. Flextime, even of two hours, would not resolve this conflict.

Respondents indicated that the trouble with flextime is compounded by the need to treat support and professional staff schedules alike. Given this need, flextime raises the potential for problems of coordination, supervision, and providing unit services when professional and support staff start or finish work at different times. Respondents described examples of problem situations: if a manager starts at 7.00 and her driver starts at 9.00, the manager may not be able to travel as needed, and if the accounts office has different hours from other offices, financial transactions could be disrupted. In the words of one institute manager, “Flextime can create a band of inefficiency.” Other managers were afraid it would conflict with their attempts to encourage punctuality.

### **Travel**

Respondents indicated that staff travel schedules were affected by the presence of dual-career families. For example, one manager reported that special attention had to be given to scheduling travel in order not to require a couple to travel at the same time, especially if the couple had children.

### **Day-Care Facilities**

Staff at one institute had investigated the possibility of establishing a day-care center for staff children. They were encouraged by a government circular requiring institutes to establish such centers. However, the circular made no provisions for funding, and the staff could not find a means for establishing or operating the center. In addition to funding, there were problems of governance, insurance, health regulations, and staffing requirements. Some women in our study suggested that even if these matters were resolved, day-care centers would be the choice of last resort; they preferred personal rather than institutional arrangements for day care. Nevertheless, this may be the only choice for some in the future as household help becomes harder to find and relatives are less available to help those who pursue opportunities in distant locations.



## **Children at Work**

One contentious issue concerning work-family conflicts involved the practice of bringing children to the institutes during working hours. Some respondents acknowledged that they bring their children to the office, but not on a routine basis and only as a last resort; others reported being annoyed and having their work disrupted by children at the institute. The issue was reported at two of the four institutes in our study. One director had issued a memorandum prohibiting the practice and citing the danger, among other things, of children being injured in accidents involving laboratory equipment or chemicals. In a tacit compromise on the issue, some staff members continue to bring children to the institute but keep them in administrative offices away from the laboratories.

## **Summary**

In summary, retention of staff with work-family conflicts is supported by a variety of coping mechanisms. We found that actual practices were more important than institute policies. Common practices include such things as unquestioned approval for leave, informal job sharing to cover for absent staff (including training and assigning substitutes), and using overtime to compensate for informal absences. However, absences were of concern to managers and scientists in the study. Respondents in all of the institutes mentioned that staff tardiness or absence is a key issue related to work-family conflicts. Attempts to discourage informal absences included using sign-in sheets and sanctions; time clocks were also being considered.

## **Equal Pay**

In industrialized countries, the average salaries of women scientists are usually lower than those of men (Vetter 1987; National Science Foundation 1990). Although men and women typically start at equal pay levels, a gap opens up after about 10 years (Brush 1991), and as women's experience increases, their salaries become smaller in comparison to men's (Northrup 1988). Recent reports from the Philippines indicate that women scientists there also generally receive lower salaries than men (National Commission on the Role of Filipino Women 1990; Licuanan 1990).

We examined the issue of pay differentials between men and women scientists in the Philippine institutes. However, we did not have access to compensation data from the institutes; in lieu of this, we inquired about the views of respondents on this issue.

Respondents were almost completely in agreement that there is no pay discrimination in their institutes. They indicated that there are functional safeguards to assure equal pay for equal work, including civil-service rules, legislation for pay-standardization, and committees in some institutes that check for flaws in the system. In spite of these safeguards, our data indicate that professional women are clustered in lower-level positions in the study institutes. In public service, lower positions imply lower salaries. Equal pay is a complex issue, and we have not drawn any conclusions here because our study did not have sufficient resources to collect and analyze the data required to adequately examine this issue.

However, respondents felt that the situation outside public-sector institutes was quite different. Almost half thought that private-sector institutes paid men more than women and preferred to hire men. These attitudes about conditions in the private sector help illustrate the importance of mechanisms in public-sector institutes that make sure that pay is not biased by gender.

## **Summary and Conclusions**

The married women in the study were concentrated in central stations, while men in general were more concentrated in outlying stations, which suggests that outlying stations have been less able to recruit women. A similar situation is reported in such stations in industrialized countries (Northrup 1988). Most of the scientists and managers in the study belonged to dual-career families, and institutes in the Philippines have found that recruiting husband and wife teams helps them fulfill recruitment targets. However, their managers must take care to place husbands and wives in separate units in order to improve their chances of success. Similar policies to permit spouse employment have been recommended in industrialized countries to attract the best young scientists (Brush 1991) and to overcome problems with locational mobility (Etzkowitz *et al.* 1992). The Philippine experience sheds some light on the benefits and risks of such policies.

We expected to find an attrition issue in the Philippines, especially for professional women with maternal responsibilities. In fact, female attrition was not an issue in the institutes studied. Some of the institutional factors contributing to this low turnover of married women include extended maternity leave and practices that involve flexible work schedules, delegation, and team work. The institutes have also adopted staff-evaluation procedures that do not penalize staff who adjust their work schedules to deal with family responsibilities. Outside factors include extended-family support and domestic help to assume some family responsibilities, although these systems are coming under increasing stress. Institutional and outside factors form a support system for professional women with families that enables the institutes to maintain a stable and productive female work force.

With this support system, the achievements of married women equal those of men in terms of publications and training at the MSc level. The women themselves have played a major role in these successes. For example, they have by and large supported their own training.

The support system is dynamic, with emerging developments such as the policy to equalize training opportunities for women. One new component, day-care centers, is linked with the erosion of an older component, domestic help, which is becoming harder to find. This new component, however, is far from realization at this time. Practical issues such as financing, legal requirements, insurance and health coverage, facility location and design, and staff qualifications must still be addressed.

As women elsewhere have found, women scientists and managers in the Philippines experience more conflicts than men between work and family responsibilities. Staff absences due to family situations are a major issue for managers. Work-family conflicts in industrialized countries have given rise to recommendations for flexible working time and part-time employment (Gordon *et al.* 1991; 1988). We found these responses in the Philip-

pines more as informal practices than as formal policy, and they entail many other things that help managers to ensure the continuity of their research programs in the face of staff absences. Cross-training, delegation of work to peers and assistants, an active sense of give and take, and teamwork to ensure that tasks were covered all support the practice of flexible scheduling. Policy initiatives for flexible schedules and part-time work in other countries should take these mechanisms under consideration.



## 6. Organizational Culture: Men and Women in the Workplace in a Situation of Parity

Studies of workplaces in industrialized countries indicate that interactions between men and women vary with the relative proportion of women present (Kanter 1977a, 1977b). Predictable organizational dynamics come into play when women are less than 15% of a job category, as is typical of research organizations in many industrialized and developing countries. Men feel uncomfortable working with women. Women tend to be viewed as symbols of their group (“tokens”) rather than as individuals. Male social stereotypes of women as mothers, daughters, sisters, or wives tend to get translated into their views of women in the workplace (Sandler and Hall 1986). Women are closely scrutinized and judged, they have to work harder to receive the same rewards and recognition as men, and they tend to be isolated from informal collegial networks and mentoring. In these situations, women have to assimilate—to take on the traits, values, and accepted behaviors of the dominant male group—if they are to succeed. Similar observations have been made for men in nontraditional occupations, such as nursing (Segal 1962), or for racial or ethnic groups who make up a minority in an organization (Kanter 1977b).

As the proportion of women increases, the organizational dynamics also change. When women represent 25% or more of the job category, conflicts between men and women tend to heighten. Men begin to feel threatened that their own career opportunities and accepted norms and rules for behavior within the organization will be challenged. Women often experience hostility and “backlash” from men, and incidents of sexual harassment often increase (Brush and Rao 1991). Ultimately, as the proportions of men and women come into balance, or reach parity, status differences diminish and the views and values of both men and women come to shape the organizational culture and norms for behavior in the workplace. Interactions come to be based on individual attributes rather than gender stereotypes. Men and women become accustomed to working together and appreciate differences among individuals (Berresford 1991).

The situation of “tokens”—women as extreme minorities representing less than 15%—can have organizational as well as personal costs. Many researchers in this field believe that the professional isolation and performance pressures associated with having women in small numbers hinder female scientists’ career advancement, research performance, and productivity (Bielby 1991; Fox 1991; Kanter 1977a, 1977b; Reskin 1978; Sandler and Hall 1986; Scott 1990; Stolte-Heiskanen 1991; Vidaver 1988). These organizational dynamics are often referred to as “micro-inequalities.”

Micro inequalities often create a work and learning environment that wastes women’s resources, for it takes time and energy to ignore or to deal with these behaviors. [They] undermine women’s self esteem and can damage professional morale. It may leave women professionally and socially isolated, restrict their opportunities to make professional contributions, and dampen their participation in collegial and academic activities. (Sandler and Hall 1986, p. 3)

Some researchers argue that the accumulation of micro-inequalities over the course of women’s careers, rather than structural barriers or overt discrimination, explains women

scientist's lower career attainment, status, and productivity (Cole and Singer 1991; Fox 1991).

The case in the Philippines is quite different from the norm of women in science worldwide. Here women comprise approximately half of the research and professional staff in most public-sector agricultural research institutions. Research organizations in the Philippines, therefore, provide us with an excellent opportunity to look at organizational dynamics and relationships between men and women in the workplace in a situation of gender parity. In our study we wanted to explore whether the perceptions, behaviors, and quality of interactions between men and women typically observed in research organizations persist in a situation of parity or whether they become more gender neutral, as would be predicted by organizational theory. To explore this question, we focused on four issues of organizational culture and intergroup dynamics that are addressed frequently in the literature on women in science:

- the presence of subtle gender bias and increased performance pressure on women;
- the quality of collegial relationships among men and women;
- the quality of vertical reporting relationships among men and women;
- the degree to which gender diversity is valued as an organizational asset.

Our expectation was that the perceptions, behaviors, and interactions of men and women in the case study research organizations would differ from those characteristic of organizations where women are minorities. We expected that gender stereotypes—the constellations of traits and behaviors attributed to the categories of “male” and “female”—from the larger society (Bielby 1991) would not have a major impact on working relationships between men and women. Similarly, we expected to find women fully integrated into the organizations in the sense that the diverse characteristics of men and women were recognized and valued and that it was accepted that both groups contributed equally to organizational goals (Brush and Rao 1991).

We were interested in what we could learn about the benefits of a gender-diverse work force and the changes that occur in working relations between men and women in situations of near parity. We were also interested in whether gender stereotypes or patterns of behavior between men and women, which constrain their performance, might persist despite more balanced proportions.

### **Performance Pressure**

In contrast to the situation typical of “token” women, we expected to find in the Philippines that women's performance would be judged by the same formal and informal criteria as men's. To examine this issue, we explored in interviews whether respondents thought women were as respected as men within the organization and whether they thought women had to work harder than men to earn the same recognition from peers and supervisors. We also compared men and women in terms of the amount of overtime worked, on the assumption that if women did have to work harder to receive the same recognition, they might be putting in more extra hours than men.

The vast majority of respondents (94%) felt that men and women received the same amount of respect. Only 25% of the women and 14% of the men thought that women had to work harder than men to earn the same recognition. Respondents argued that in scientific organizations, recognition and respect are based on accomplishments that are visible, objective, and measurable. They believed that there was little room for bias or discrimination to enter into judgments of researchers' performance. The following quote summarizes the opinions expressed by the majority of respondents:

*Respect is gender neutral as long as scientists have acceptable accomplishments and do their job. (female scientist)*

Regarding working overtime, respondents saw no difference between men and women. Approximately 70% of both the male and female respondents thought that men and women worked equal amounts of overtime. Similarly, 75% of both male and female respondents indicated that they regularly worked overtime. Approximately one-third of both men and women indicated that they worked overtime to increase their accomplishments and advance their career. The remainder indicated that they worked overtime in response to work demands or because of their own desires and/or interests.

In summary, the interview data confirmed our hypothesis that in a situation of parity, women would not feel that they experience more performance pressure than men. Women feel comfortable with their position in the workplace and believe that they are rewarded equally for comparable performance. It should be noted, however, that our data only shed light on *perceptions*, not on actual *behaviors*. A much more in-depth study would be required to determine if women are actually judged by the same norms as men. Gender bias can be very subtle and often unconscious. It may influence interactions in the workplace and women's career attainment even when it is not perceived by the women affected (Bielby 1991; Fidell 1975; Fox 1991; Sandler and Hall 1986; Stolte-Heiskanen 1991). The degree to which such subtle biases affect the way in which women's performance is assessed and their careers develop in the Philippines remains unclear, but it may be one factor explaining the observations on women's lower career attainment reported in chapter 4.

## Collegial Relationships

The literature on women in science in industrialized countries has given considerable attention to the issue of whether women, as relatively new entrants to the scientific community, have been able to develop the same level and quality of collegial relationships as men. This is a key issue since collegial interaction is considered to be critical for successful research.

Research is a social process. The productive scientist must continually seek information pertinent to his or her research, shape and reshape the course of the work, update its potential relevance, and test its significance. This takes place not just formally through conference presentations and publications, but more so, interactively, in conversations in the lab, the lunchroom, departmental corridors, and after-hour gatherings at professional meetings. (Fox 1991, p.195)

Studies of women scientists in industrialized countries have found that their interactions with colleagues are often more limited than those of men, and their professional networks are less well developed. Women tend to collaborate with fewer researchers, they have fewer professional responsibilities outside of their organizations (e.g., serving on editorial boards or as officers in professional societies), and they attend fewer professional meetings (Cole 1981; Fox 1991; Kaufman 1978; Krashket *et al.* 1974; Reskin 1978; Reskin and Hartmann 1986; Sandler and Hall 1986; Stolte-Heiskanen 1991). Societal norms for behavior between the sexes, social awkwardness, and gender bias often impede communication and interaction between male and female scientists. Women may be welcome, but they are rarely treated as “insiders.”

Although women have moved into science, they are not **of** the community of science. (Cole 1981, p. 390)

Some argue that women’s more limited contact with the community of science has costs in terms of research productivity and quality. It reduces women’s ability to publish, to do research, and to be cited. It also reduces their access to new ideas and to opportunities to test their own ideas. This can not only reduce women’s productivity, but it also has organizational costs (Cole 1981; Fox 1991; Sandler and Hall 1986; Stolte-Heiskanen 1991).

In this study, we wanted to see if impediments to collegial interactions between male and female professionals dissipated in research organizations where there is a better balance between men and women. We posited that gender would not be a significant factor affecting formal and informal relations among colleagues.

To test this proposition, we collected information on collegial relationships—or horizontal relationships among peers. We looked at whether women were perceived to have the same level of influence as men in the organization. We focused on influence, since it is often wielded through informal channels and personal relationships. We explored how men and women felt about working and traveling with colleagues of the opposite sex and whether they thought men and women worked well together in their organizations.

The majority of both men and women (78%) thought that women had as much influence in their organizations as men, even though women were more likely than men to occupy junior positions. Respondents observed, however, that men and women often wield influence in different ways. Women tend to speak out more in public fora and to try to influence decisions through formal channels. Men, on the other hand, are perceived to work more behind the scenes, using informal channels and personal contacts. This was confirmed in the focus groups where it was noted that women’s more limited opportunities to meet and socialize outside the workplace with other professionals or with those in more powerful positions was a constraint to their ability to influence, advance their careers, and move into senior management positions. Despite parity in numbers, women still tend to rely more on formal channels of communication and influence that are less dependent on rapport, friendship, and social contacts.

Regarding working relationships, the interview data indicated that gender was not a significant impediment to developing effective professional relationships. Ninety-five percent of the respondents confirmed that men and women worked well together in their organizations. Even with respect to traveling, where professional standards may have less



influence on behavior, 73% of the respondents indicated that they were comfortable traveling with colleagues of the opposite sex. Some women preferred to travel with men for security reasons.

Nevertheless, although staff did not feel uncomfortable working with colleagues of the opposite sex, 65% of both men and women said that they found it easier to work with colleagues of the same sex. This observation was supported by data on the composition of the respondents' collegial networks: 66% of the men and 60% of the women reported that three or more of their four closest colleagues were of the same sex. For women, 40% said that all of their four closest colleagues were women. Similar findings have been reported for women scientists in Finland (Stolte-Heiskanen 1991).

Respondents explained that they found it easier to work with colleagues of the same sex because they could establish rapport more easily. They shared common experiences and could discuss personal issues more freely. They could socialize outside of work without the sanctions of rumor and gossip. And, they could relax and be less formal with one another. Several commented on the need to maintain more formal relationships with colleagues of the opposite sex in order to protect themselves from gossip or innuendo.

*I am more at ease with women. There is less tension. We share the same interests and we can be more informal with one another. (female scientist)*

*I am more comfortable working with men because men think the same way. We can share our secrets and family issues. We develop closer relationships. (male scientist)*

In summary, the data indicate that, as expected for a situation of parity, gender is not a significant barrier to collegial relationships between male and female peers in the workplace. Men and women have learned to work together professionally and do not experience social discomfort when working with colleagues of the opposite sex.

Gender roles were seen, however, to affect women's ability to pursue professional contacts and interactions outside of the workplace. It is also very interesting that even in situations of parity, people gravitate more towards colleagues of their own sex in their closer working relationships. Thus, despite the high proportions of women in the study institutes, gender and the norms dictating the roles of men and women in society, appear to continue as important factors shaping informal alliances, teams, and partnerships within research organizations. The critical difference is that with larger numbers of women, this does not translate into isolation of women with the concomitant organizational cost of lost productivity.

## Reporting Relationships

The interview data indicate that, in contrast to horizontal relationships among peers, gender does have a strong influence on vertical reporting relationships between staff and supervisors. Some negative stereotypes and discomforts persist regarding women in managerial roles and their ability to supervise men. This difference in the impact of gender on collegial compared to supervisory relationships likely reflects both the lower proportions of women

in management positions as well as the cultural stereotypes of appropriate roles for men and women in Filipino society (Guzman and Estuara 1991; Pundol 1992; Vitug 1994).

To explore the effect of gender on vertical relationships within the case study institutes, we looked both at mentoring, which is based more on informal relationships between senior and junior staff, as well as the formal reporting relationships between scientists and managers.

### **Mentoring**

In contrast to the situation of women scientists in many industrialized countries, women researchers and professionals in the Philippines do not appear to be disadvantaged in terms of mentoring compared with men. Ninety percent of the respondents thought that younger women received the same amount of support and guidance as younger men in their organizations.

Data on the career histories of respondents indicated that women are more likely to receive guidance from other women to shape their choice of career, discipline, and place of employment. Seventy-seven percent of the women reported that a woman had influenced their educational and/or career decisions. In contrast, only 46% of the men cited a woman as having been influential in their careers, but 63% cited a man as having been influential. Only half the women cited a man as having had an important influence. Although mentoring relationships are not gender limited, our findings suggest that once women are located in more senior positions, the problem of younger women not finding suitable mentors recedes.

It should also be noted that mentoring has some negative connotations in Filipino culture. Institute managers observed that mentoring could be construed as cronyism, which is rooted in Filipino culture (the “padrone” or “sip-sip” system) and which the institutes are struggling to reduce or eliminate. Thus mentoring is often not envisioned as an appropriate formal response to enhance the professional development of women within organizations.

### **Supervisory Relationships**

Although women in senior scientific positions appear to be accepted by both men and women as mentors and counselors, they are not as well accepted in management positions where power and authority are vested. Half of the respondents thought that male professionals had difficulties reporting to a female manager. It was observed, however, that men had fewer difficulties reporting to older women in management positions because age bestows seniority. Much of the commentary centered around men’s dominant decision-making role in domestic life and the conflict they experience in being placed in a subordinate role to women managers in the workplace.

*Men do not want to be dominated by the weaker sex. Men will adapt, but it will be hard for them. (female scientist)*

*Men are used to being the head of the household and the decision maker. They resent reporting to a woman manager at work. (male scientist)*

*If a man is much more junior in position, there will be no problem reporting to a senior female boss. But if the male subordinate and the female boss are the same age, there could be difficulties. (female manager)*

Cultural stereotypes of men and women appear to strongly influence perceptions about women's ability to be managers (Andres 1985; Pundol 1992; Vitug 1994). In our study, characteristics commonly cited for strong managers in focal groups were characteristics typically associated with men in Filipino society (table 6.1). Pundol (1992) reports similar findings from focal groups conducted during workshops at the Asian Institute of Management where "invariably participants selected identical adjectives for the attributes of the ideal manager and the attributes of a man." Andres's (1985) description of an ideal manager in the Philippines is similar to that provided by our respondents for male managers.

**Table 6.1 Salient Characteristics of Male and Female Managers as Identified by Professional Staff in Focus Groups**

Salient Characteristics of Male and Female Managers	
Male managers	Female managers
Decisive	Decisive
Risk-taking	Cautious
Aggressive	Hard working
Leadership skills	Systematic and well organized
Quick to action	Reliable
Well connected	Persistent
Objective	Nurturing, personal, empathetic
Vision/able to see the "big picture"	Detail oriented

*Note:* Composite from output of focus groups at IPB, PRCRTC, and PRRI. The characteristics were supported by data from the interviews.

While respondents also characterized both male and female managers as decisive, most of traits cited as characteristic of female managers were different from those of men. The traits tended to reflect the stereotypes of women in their domestic roles. Some respondents observed that these different sets of characteristics explained why women were found more often in middle management and deputy positions, where they would be responsible for implementation, and men were found more at top-level positions where they are called upon to define the goals, strategies, and overall direction for an organization. The differences in perceptions of male and female managers are well summarized by the following quotes from two male managers.

*Men are very assertive and this can cause conflict. [On the other hand,] women are more emotional and they can become personal. (male manager)*

*Women cannot be firm and they do not talk directly to men. Women managers change their mind frequently and are often erratic and indecisive. Women tend to get angrier easier. If male staff are having problems with a male boss*

*they can go have a drink and sort it out. Women bosses cannot do this with their staff. (male manager)*

Sixty-three percent of the respondents thought that women had the same opportunities as men to move into middle management positions if they were interested. But most felt that women were constrained in moving into top leadership positions. The most common explanations reverted back to gender roles and conflicts between a woman's socially accepted role as wife and mother and a professional role where she would be in a position of power and authority over men. The types of constraints cited included women's lack of connections and professional contacts, their inability to meet at night and socialize with professional colleagues, men's difficulties talking frankly with and reporting to women, and stereotypes that characterize women as too emotional for management positions.

*Women have fewer opportunities. They have fewer professional contacts and connections; men have trouble reporting to women so organizations do not seek women managers; women have children and therefore have less time to invest in the job and cannot attend meetings at night; women cannot socialize because they are more likely to have husbands who are jealous. (male manager)*

*Women do not have the same opportunities. Men are closer to the Director. They have a better chance to move into management because the Director knows them better. Men have stronger informal associations. They socialize more, stay up late talking, participate in decisions. Women cannot join these groups or events. That limits their opportunities. (female scientist)*

In summary, contrary to our expectations for a situation of parity, gender has an important bearing on vertical reporting relationships within Filipino research organizations. Strong cultural stereotypes and gender roles, particularly the norm of men as decision makers within the household and women as subordinate, influence the behavior and perceptions of men and women in reporting relationships. The data from the cases and other studies suggest that these culturally defined gender roles, combined with social norms inhibiting women's ability to cultivate professional contacts with men outside of the workplace, make it more difficult for women to attain and perform effectively in management positions, particularly in top decision-making or policy-making positions. Similar observations are reported for other sectors in the Philippines as well (Andres 1985; Guzman and Estuara 1991; Licuanan 1992; National Commission on the Role of Filipino Women 1990; Pundol 1992; Vitug, 1994). Nevertheless, as the proportion of women has increased, men and women have been learning to adjust to new gender roles within the workplace. Respondents frequently observed that although both women managers and their male subordinates were not entirely comfortable with their relationship, they usually were able to adjust. This is a dynamic area of adaptation to the changing composition of professional and managerial staff in research organizations, and it is not surprising that given the power relations involved, change is slower and more difficult to realize.

## Value of Diversity

We expected that in the Philippines, where there is a situation of gender parity, staff diversity would be seen as an organizational asset rather than as a managerial problem. We posited that managers and scientists would recognize and be able to articulate the benefits that accrue to an organization from having a diverse work force.

To examine this question, we collected information through interviews and focus groups on men and women's perceptions of

- whether men and women tended to have different strengths and weaknesses as managers and professionals;
- whether men and women made different contributions to the workplace;
- whether the organization benefitted from such diverse contributions.

The data indicated that on the whole, gender diversity was viewed as contributing positively to the organization, rather than as creating problems and detracting from performance. The majority of the staff and managers perceived that men and women had professional qualities that were unique and which led them to make distinct contributions to the organization. The majority were able to articulate the benefits of these diverse contributions.

Men and women were commonly seen to have distinct strengths that were related to gender. For example, the distinct attributes assigned to male and female managers discussed above were viewed positively by many respondents. They saw them as complementary, with both sets of characteristics important to the overall functioning of an organization. Men were characterized as excelling in providing leadership and setting the direction for an organization, whereas women were seen as stronger on the operational side of implementing plans and getting things done.

Part of the perceived differences between men and women managers may reflect the characteristics men and women value or seek to achieve as scientists. It is interesting to note that women respondents stressed dedication and commitment as the key characteristics of outstanding scientists, while men emphasized leadership and risk taking (table 6.2).

Eighty-five percent of the respondents felt that women made unique and positive contributions to the workplace. The benefits of having both men and women professionals in the workplace were expressed primarily in terms of

- research quality and organizational performance;
- working relations in the organization.

**Table 6.2 Characteristic of Outstanding Scientists in the Philippines as Perceived by Male and Female Research Staff**

Salient characteristics of outstanding Filipino scientists (listed in order of frequency)	
As viewed by women	As viewed by men
dedicated	hardworking and disciplined
strongly committed	strong leadership skills
intelligent	risk taker
hardworking and disciplined	intelligent

Note: Compiled from responses given in focus groups held with staff from IPB, P RCRTC, and PRRI.

Almost half of the responses related to the contributions women made to improved research quality and performance. It was argued that men and women have different ideas and perspectives and that this contributes to problem solving and creativity within the organization. Men and women tend to look at problems differently and come up with different types of solutions. Respondents felt that this mix of ideas and perspectives strengthened research. Twenty percent of the respondents thought that women improved the organization's ability to work with its clients because they tended to interact better with farmers and they did not neglect female clients.

The following quotes from a male and female manager sum up the statements made by many other respondents:

*Men and women have different backgrounds and different outlooks. They bring different ideas and perspectives into the workplace. This is positive. It enriches ideas. It also ensures that all clientele will be addressed. Men would tend to only think of the needs and roles of men and overlook women as clients. As a research organization, we cannot afford to do this. (male manager)*

*Women offer more diverse ideas. Men are more straightforward, but women look at many possibilities, alternatives, and offer different solutions to problems. Women tend to look more at details, to explore more, while men look more broadly. In this way they complement each other. (female manager)*

The benefits reported of having women in the workplace also included their skills in human relations. Women were seen as often being better than men at dealing with human relations, as being more sensitive to colleagues' needs and problems, as good mediators who could reduce conflicts, as more nurturing, and as more open to assisting colleagues and staff with personal problems. Men tended to see women as more disciplined and hardworking and as paying more attention to detail. Women, on the other hand, saw men as providing more leadership. As one female manager observed:

*On technical issues, men and women are the same. But in terms of relations in the workplace, they are different. Women are more nurturing, caring, and*

*sensitive. Men are more aggressive and provide leadership. A good manager balances these qualities of men and women. (female manager)*

We have seen that on the whole, staff valued diversity. Of particular interest was also whether managers would see diversity as an asset or as a management problem. Of the 10 managers who responded, eight saw gender diversity as making a positive contribution to the organization and two were neutral. Of those who viewed it positively, half actively managed diversity as an organizational asset. They used it to strengthen problem solving, planning, and execution of research.

*The diversity that women bring to the workplace is very good. They balance the ruthlessness, rough edges, and temper of men. I appreciate their humanism. In the Executive Committee, for example, their views are different from the men and this is important to me. I support women on my staff because I value their different contributions. (male manager)*

In summary, the data supported the proposition that in organizations with male and female parity, managers and scientists would be able to articulate the values of a diverse work force. The managers and staff interviewed in the study saw men and women as having unique, but often complementary, characteristics as both scientists and managers. These different characteristics were, on the whole, appreciated and seen to enrich the organization and to strengthen its performance. Most managers viewed gender diversity as an organizational asset, not as an organizational problem.

## Summary and Conclusions

Our study indicates that gender recedes as a variable influencing collegial working relationships between men and women in situations of parity. This is an important and encouraging finding, given that women are relatively recent entrants into scientific institutions in the Philippines. Although men and women, on the whole, still prefer and find it easier to work closely with colleagues of the same sex, they maintain effective and productive working relationships with colleagues of the opposite sex. Moreover, men and women are able to articulate the benefits of having a gender-diverse staff in terms of complementarity in skills and approaches, research quality, organizational performance, working relationships, and the climate or ambiance of the workplace. Norms of social behavior and accepted gender roles do, however, limit the degree of interaction between male and female colleagues outside of the workplace. To some extent this circumscribes women's access to information and ideas, their opportunities to cultivate professional contacts, and their ability to wield influence through informal channels.

In contrast to collegial relationships, gender continues to be an important variable affecting vertical reporting relationships and women's access to high-level positions. While men appear willing to accept women as equal colleagues, and even as informal mentors or counselors, they are less accepting of women in positions of power and authority. Although men and women are adjusting to these new relationships in the workplace, strong cultural stereotypes of men's dominant and women's subordinate decision-making roles within the household continue to color and affect working relationships. These stereotypes appear to

limit women's opportunities for career advancement into management positions, particularly into top decision- and policy-making positions.

As reported in chapter 4, women have had lower career attainment than men in the four research institutes studied. Our data show that it has taken longer for women to advance in their careers even though, as a group, they have comparable degree levels and their rate of publication—a key indicator of productivity—has been equal to that of men. This raises questions about the common assertion by respondents, both male and female, that there is no discrimination towards women in public-sector organizations where civil-service regulations protect them. While overt discrimination does not appear to be present, subtle gender bias does appear to continue to influence women's career attainment even in these situations of parity. Stereotypes of men and women prevail and color people's perceptions of appropriate roles for women and men at work as well as at home. The causes for the lower career attainment of women scientists in Philippine research organizations merits further exploration. Gender stereotypes appear to be a contributing factor, but this will need to be explored in a more focused and rigorous study.



## 7. Conclusions and Recommendations

The Philippines represents the case of high participation by women in agricultural science. For this study, we have drawn some comparisons between organizations in the Philippines and those reported in industrialized countries, primarily the United States, where women's participation is lower but where issues of women in science have been studied extensively although not particularly in agricultural research.

We anticipate that women will constitute a growing proportion of professional staff in agricultural research organizations in many developing countries over the next decade. For this reason, we expect that this study will be valuable to a wide range of research managers and that the lessons drawn here will assist research managers elsewhere to anticipate opportunities and constraints and to manage the changes in their human resources most effectively and efficiently. At the same time, we hope that the study will serve research managers in the Philippines, helping them to understand their own organizations better, their areas of strength as well as areas that need continued attention, and to anticipate future needs and prepare for them accordingly.

To address the questions posed for this study, we collected quantitative and qualitative information. We wanted the quantitative information to illustrate the structural dimensions of the issues; the qualitative information provides insights into the cultural aspects of gender-related issues as well as highlighting the situations and perceptions of women and men confronting these issues.

### Key Observations

**The Philippines has one of the highest rates of participation of women in agricultural research of any country in the world.**

Women constitute approximately 50% of the agricultural researchers in public-sector organizations (government institutes and universities). Key factors contributing to this high rate of participation include

- long-standing educational opportunities for women and an emphasis on science in the curricula of primary and secondary schools;
- the relative gender neutrality of science as a profession, in contrast to professions such as law and engineering, and the increasing gender neutrality of agricultural research, which has come to be more associated with science than with farming (a traditionally male domain);
- the growth in the number of women qualified for careers in agricultural research—the number of women studying agriculture and related sciences increased 600% from the early 1970s to the early 1980s; by 1990, women accounted for 60% of the students earning master's degrees in agriculture and related fields from the University of the Philippines, Los Banôs;
- the expansion of disciplines considered important for agricultural research, which has created new opportunities for women;

- the growth in jobs in agricultural research in government agencies and universities, which are attractive to women because they are governed by nondiscriminatory civil-service rules and provide flexibility and autonomy in work scheduling and travel requirements, among other things.

**Women have been replacing men in public-sector agricultural research over the past two decades.**

The stagnation of salaries in government agencies since 1986 has led many male researchers to move into jobs in the private sector or abroad. Women, in turn, have been drawn to the public sector where there is less discrimination, greater flexibility, and good job security

**Women concentrate less in traditional field-oriented agricultural disciplines.**

Women are found more in the support disciplines (e.g., plant pathology and entomology), biological sciences, food technology, social sciences, and extension-related fields (e.g., agricultural education). Women are less common in the traditional agriculture disciplines (e.g., plant breeding and agronomy). Many disciplines are now perceived, however, to have a balanced distribution of men and women. Of those disciplines perceived as having the best opportunities for advancement, two disciplines were viewed as being male dominated while three were seen as balanced male-female. Contrary to conventional wisdom, women do not spend significantly less time in the field than men; in fact, women were seen as an asset in field-based programs in the Philippines.

**The attrition of women scientists is low and comparable to that of men.**

Women do not typically leave their jobs when they marry and have children. Jobs in the public sector provide support for women combining family and professional responsibilities. These jobs offer stability, flexibility in time management, and other institutional practices that allow women to balance their diverse work and family responsibilities.

**Women appear to be underrepresented in senior scientific and management positions and to advance more slowly than men.**

Twice as many men as women are in senior positions, and 10% of the men are managers, compared to 3% of the women. The reasons for women's lower career attainment are not clear. The men and women in our sample had the same length of service in their institutes, and there were no significant differences between their average ages. Women's productivity, as measured by publications, was equal to that of men. A higher percentage of men have PhDs, but the difference is not sufficient to explain the differences in career attainment. The status of different disciplines and problems with mobility for field work do not appear to be important factors inhibiting career attainment. Recently, a policy regarding training that was disadvantageous to women was removed and a performance-based promotion system installed; however, since the promotion rate for all staff is slow, the effect of these reforms on the career attainment of women may not yet be visible.

We found that the scientists and managers held strong cultural stereotypes about gender roles, which might, in part, explain women's lower career attainment. These stereotypes

appear to make it more difficult for women to attain senior positions and perform effectively within them. They may also influence women's choices against pursuing senior positions.

Professional women are more likely than professional men to have a spouse who is also a professional, which makes spouse employment considerations more important for women. Women are more likely than men to make compromises for the benefit of their spouse's career—compromises that have a negative effect on their own career, such as delays in training, not going abroad for training, and reduced geographic mobility.

**Women experience more intense work-family conflicts than men, but these do not appear to be a major constraint to research productivity or career attainment.**

Despite strong social norms that reinforce a woman's primary responsibility for child rearing, there are factors both within and outside the institute that form a support system for professional women with families. Through such policies as extended maternity leave and practices that involve flexible work schedules, delegation of responsibilities, and team work, the institutes are able to maintain a stable and productive female work force. In addition, the institutes have adopted evaluation procedures that reward output. To complement this, staff who take time off to deal with family responsibilities are encouraged to make up work through overtime and working at home. Noninstitutional support includes extended families and domestic help to assume, for example, some child-care responsibilities.

This support system is dynamic. We found emerging components such as a policy to equalize training opportunities for women. The development of one new component, day-care centers, is linked with the erosion of another component, domestic help, but it is still far from being realized. Practical issues such as financing, legal conditions, insurance and health requirements, facility location and design, and staff qualifications remain to be addressed.

**Married women are more than twice as likely to be located in a central station than in an outlying station.**

The opposite was true for married men. Women cluster more in central locations because of spouse employment opportunities and support systems for child care, which suggests that outlying stations have been less able to recruit married women, i.e., less able to tap the pool of scientific talent. To assist in recruitment, research organizations have been given an exemption from a civil-service law against nepotism for in order to permit them to hire both husbands and wives. Managers found that recruiting husband and wife teams contributes to their ability to fulfill recruitment targets; however, they must take care to place husbands and wives in separate units in order to improve their chances of success.

**Staff absences due to family situations is a major issue for managers.**

Staff reported that they used annual and/or sick leave for family emergencies; data from the institutes show that women take more annual leave, while men take more sick leave. We found informal practices for flexible working time and part-time employment that allowed managers to cope with this issue. Other practices also enhanced the capacity of managers to assure the continuity of their research programs in the face of staff absences: cross-training so that any task could be performed by more than one person, delegation or responsibility to

peers and assistants, an active sense of give and take, and teamwork to assure that tasks were covered.

**Gender does not inhibit the development of productive working relationships among peers.**

While most of the scientists in the study preferred and found it easier to work with colleagues of the same sex, they did not see gender as an obstruction to professional relationships with colleagues of the opposite sex.

**Gender is an important variable affecting vertical reporting relationships even in organizations with large proportions of women.**

Cultural stereotypes of men's dominant and women's subordinate decision-making roles in the household inhibit some men in reporting to a female supervisor. As mentioned above, such stereotypes may affect women's career attainment. Women tend to rely more on formal channels of communication and influence in their organizations, whereas men tend to rely more on informal communication.

**Scientists and managers can articulate the value of a diverse work force**

Men and women were perceived to bring unique and often complimentary skills and characteristics to the workplace. The benefits of the diverse work force were expressed in terms of improved research performance and working relations within the organizations, and most managers saw gender diversity as an organizational asset, not as a problem to be solved.

## **Recommendations**

After the analysis and interpretation of the data was completed, the study team consulted senior managers from the study institutes and national development organizations about possible recommendations resulting from the study. We found it instructive that among the recommendations discussed, three were rejected: special training in management and leadership for women, flextime, and mentoring (see discussions in chapters 5 and 6). As a result of the consultation, the following recommendations were approved:

1. Institute leaders and managers should strive to give women the same encouragement and opportunities as men to attain senior scientific and management positions.
2. Research institutes should promote the policies and practices that have been developed to manage the gender diversity of the work force. These policies and practices should be considered as a strength and used to attract and retain talented professional staff, and they should be encouraged in order to enhance staff productivity.
3. Data on human resources should be disaggregated by sex; personnel managers and unit heads should routinely monitor and compare key indicators, such as promotion points, in order to alert managers to staff-development needs.

4. Both men and women need to confront gender stereotypes of men and women in managerial and policy-making roles and understand how these stereotypes influence decision making. Gender sensitization training for men and women could help clarify the strong influence of gender stereotypes.
5. Women and men should have opportunities for training in leadership and management in order to develop the skills required to deal effectively with subordinates and supervisors and to accomplish the goals of the institutes.
6. Research organizations and their staff should consider how they can jointly provide for the care of children of working parents on the premises of the organizations.
7. The coordinating council for research in the Philippines (PCARRD) should provide leadership to conduct studies concerning how to facilitate the attainment of senior scientific and management positions by women.
8. The council should provide linkages for research institutes with organizations in the Philippines working on gender-related issues, such as the establishment of day-care centers, the training and development of women in science and management, and the role of women in development, among other things.
9. The council should provide leadership for the dissemination of the results of the case study to the consortia, National Commission on the Role of Filipino Women, and elsewhere. The council should help establish a gender team in each consortium to undertake gender-related activities, and these teams should constitute an informal network to further gender-related initiatives.
10. The Departments of Science and Technology, Agriculture, Education, Culture, and Sports, and other government agencies should provide resources (staff time and funds) to promote gender-related activities, such as additional research studies, seminars for the discussion of gender issues, publications on gender-related issues, information resources about professional women, scholarships for women scientists and technical staff, and the establishment of day-care centers, among other things.

### **Lessons from the Philippine Case**

We are likely to see increasing participation of women in public-sector research organizations in developing countries. Where there are large discrepancies between salaries in the private and public sectors, men are likely to move into the private sector and women will constitute an increasingly large share of the professionals in the public sector. Professional positions in government and academe are attractive to women because of stability, autonomy, security, benefits, flexibility, and policies that minimize discrimination. Public-sector research organizations should recognize this as a strength and use it as a means to attract top women. In addition, having women visible in agricultural research sends a positive signal to young women and helps increase the number of female students in the pool of potential staff.

Even in situations where women constitute a major segment of the professional work force, constraints to their career attainment may persist. The factors involved in this are complex and their interactions are not always clear. The constraints may be of two types. The first type includes institutional barriers, such as limits to training grants for women with small children, and the effects of reducing or removing such constraints may take a long time to become apparent in organizations that are not expanding. The second type are sociocultural constraints. Among the most important of these are gender stereotypes and social norms about the appropriate roles of men and women. These stereotypes may affect the encouragement and support research leaders and managers give to women and the opportunities for promotion made available, as well as the decisions women, themselves, make about investing in career development. Cultural constraints appear to have the strongest bearing on women's opportunities and their interest in moving into management positions.

One role of management is to stimulate attainment at all staffing levels in order use the work force efficiently. This can be done through policies and practices that reduce the negative impact on performance and career attainment caused by the conflicts that arise from dual-career families and women's family responsibilities. Reduced attainment due to institutional or cultural constraints indicates suboptimal use of professional resources in an organization.

The following are some of the key policies used successfully in the Philippines:

- exempting research institutes from the standard civil-service policy regarding nepotism in order to permit employment of spouses within the same organization;
- using spouse employment packages where institutes, particularly those in remote locations, recruit both husband and wife;
- generous maternity leave (two months paid leave) with an option for additional unpaid leave;
- allowing the use of sick leave to care for ailing family members;
- removing restrictions against women with young children receiving support for training;
- encouraging the development of day-care facilities.

Key practices include

- flexibility in use of leave without pay for family matters;
- flexibility in formal office hours for professional staff;
- emphasis on teamwork, cross-training, informal job sharing, and delegation of responsibility so that staff can fill in for one another;
- support systems among colleagues;
- appreciation of the benefits of diversity and the contributions of individuals with different backgrounds, experiences, and perspectives.

Regarding working relationships, gender becomes less important but does not disappear as a factor influencing working relationships, communication, and informal networks in organizations with a large proportion of professional women. The closest working relationships continue to be between people of the same sex but these are not exclusive and, therefore, do not have high organizational costs. While men and women can learn to work together as peers, changes in attitudes and behavior are more difficult to bring about in supervisory relationships. Gender stereotypes are most tenacious with respect to women moving into formal positions of power and authority.

The Philippine study revealed strengths and weaknesses in our research design, both of which call for more research. For the questions posed in this study, more data on the following areas would be useful: family, employment, and publishing histories, the flow of scientific information, mobility (transfer and promotion) within the organization, economic activities of professional staff outside the organization, and institutional capacity for monitoring gender-related issues. Our study also points out areas where further research could be fruitful. Career attainment stands out as one area where more conceptual development and adapted research methodology, especially concerning cultural dimensions, would be very productive. Another important question is how applicable the concepts about and research on women in science are to other areas of diversity, such as age and ethnicity, among other things.





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## **ANNEX 1: Case-Study Research Questions and Propositions**

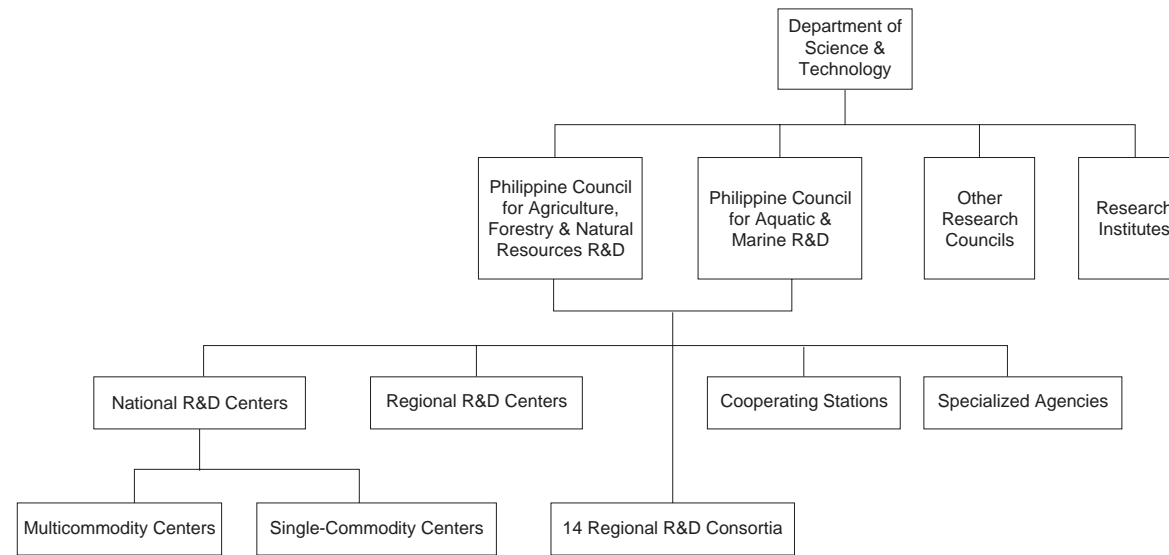
<b>Question 1</b>	<b>Why is there an increase in the proportion of professional women in some developing countries?</b>
Proposition 1	The supply of women for a profession is affected by its status; women tend to cluster in lower-status (lower-paid) professions. The increase of professional women in agricultural science indicates a decrease in the status of this profession.
Proposition 2	The supply of professional women is affected by the visibility of women in the profession; if women see that other women have successful careers in agricultural research, they will be more likely to choose to be educated in a field related to agricultural research.
Proposition 3	The entry of professional women to an organization is affected by the visibility of women in the organization; women will be more likely to apply for jobs in NARS if they perceive that women have opportunities for career advancement in the NARS.
Proposition 4	The entry of professional women to an organization is affected by its geographical location; women are more likely to choose organizations in central rather than isolated locations. Central stations in NARS will have a higher proportion of professional women than isolated stations.
Proposition 5	The retention of professional women is affected more by work-family conflicts than the retention of men. Married women have more work-family conflicts than men or than single women. The average length of service is shorter for married women than for men or for single women; there are more single women than single men in NARS.
Proposition 6	The retention of women is affected by the proportion of women in an organization; the attrition rate of professional women will be lower in organizations where there are higher proportions of women.
<b>Question 2</b>	<b>Are women underrepresented in senior scientific and management positions in agricultural research organizations in some developing countries and, if so, why?</b>
Proposition 1	Women scientists tend to be educated and assigned jobs in laboratory-oriented sciences, which in some agricultural research organizations have lower status than field-oriented sciences. Their choice of discipline affects their advancement into senior scientific and management positions within the organization.

- Proposition 2      Women professionals have less job mobility than men professionals and promotion is linked to mobility.
- Proposition 3      The work-family conflicts of women professionals reduce their ability to make investments in the time and effort required to advance in their careers. For example, professional women heads of households face greater work-family conflicts than men heads of households.
- Proposition 4      Women scientists avoid field jobs, and fieldwork is valued in promotion decisions in agricultural research organizations.
- Proposition 5      Women professionals have lower degree levels than men professionals, which reduces their opportunities for advancement in senior scientific and management positions.
- Question 3      How does an increase in professional women in agricultural research in developing countries affect the issues that managers have to deal with and the institutional responses to these issues?**
- Proposition 1      An increase of professional women coincides with an increase in dual-career families; the increase of dual-career families affects recruitment and staffing policies and practices. For example, recruitment policies for spouse employment and staffing practices regarding relocation should become more flexible.
- Proposition 2      Women have primary family responsibilities; organizations with many women need to make adjustments in personnel policies and practices to address work-family issues. For example, policies to allow flexible hours and child-care leave and practices of job-sharing and part-time work become more common.
- Proposition 3      An increase in professional women is accompanied by an increase in attrition (women have higher rates of attrition than men) and in pressures for prolonged leave. Policies to deal with these issues, including promotion policies and practices to accommodate professionals who take time off for maternity and child rearing, will become more common.
- Proposition 4      Women tend to be paid less than men in the same occupation with equal experience (length of service); tensions concerning compensation will increase with the increase of women.
- Question 4      How do different proportions of men and women in agricultural research organizations in developing countries affect perceptions, behaviors, and the quality of interactions between men and women in the workplace?**
- Proposition 1      In situations of parity, there will be more even distribution of women across occupational niches within an organization (i.e., more even distribution across disciplines, across operations versus support services, or in

staff versus management positions). Balanced distribution across occupational niches means that women are not isolated in support-service jobs, that women have more lateral mobility (there are fewer “windowpanes” that obstruct women’s lateral mobility), and that women have more upward mobility (there are fewer “glass ceilings” that obstruct women’s ability to advance and gain access to power within the organization).

- |               |   |
|---------------|---|
| Proposition 2 | In organizations with male-female parity, stereotypes of women professionals should break down.   |
| Proposition 3 | In organizations with male-female parity, women should not be subject to stronger performance pressures than men; women should not have to work harder for the same rewards or recognition. |
| Proposition 4 | The presence of women in senior positions makes junior women less vulnerable to subtle or overt discrimination.   |
| Proposition 5 | In organizations with male-female parity, managers and scientists will be able to articulate the value of work-force diversity.   |





**Figure 1A. Organizational linkages of the Philippine Agriculture and Resources and Development System**



## **ANNEX 2: The Philippine National Agriculture and Resources Research and Development System**

### **Organization of the Philippine NARS**

The Philippine agricultural research and development system is a complex one. It reflects the very diverse ecology and archipelagic nature of the country. Its mandate covers research and development activities in crops, livestock, fisheries, forestry, natural resources, and the environment.

The organizational components of the national research system are very diverse. There are two basic structures: two planning and coordinating bodies at the national level and a network of research centers and stations that make up the National Agriculture and Resources Research and Development Network (NARRDN). The network consists of research agencies belonging to five government departments (Agriculture; Agrarian Reform; Environment and Natural Resources; Education, Culture, and Sports; and Science and Technology), private research centers, parastatals, and nongovernment organizations. Gapasin and Magboo (1986) have described the components of the network and the responsibilities of member agencies.

There are two research councils involved in agricultural research, the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and the Philippine Council for Aquatic and Marine Research and Development (PCAMRD). They are the central policy-making and research-coordinating bodies of the NARRDN and are under the Department of Science and Technology. Their mandates include formulation of strategies, policies, and plans for the national research system; generation and allocation of government and external funds; and planning, coordination, monitoring, and evaluation of R&D projects.

The Philippine NARS is a large system. In 1986, the national research network consisted of four national multicommodity centers, eight national single-commodity centers, eight regional centers, 83 cooperating stations, and 15 specialized agencies (Gapasin and Magboo 1986). The organizational linkages of the various components of the system are shown in figure 1.

PCARRD defines the responsibilities of these centers and stations by the types of research they may conduct and their special commodity or disciplinary focus. These provide the basis for reviewing and subsequent approval of their research programs and projects, allocation of resources from government funds (including those from donors), determining scholarship grants for training, and some support for equipment procurement and facility development.

### **Research Institutes in the Study**

Of the four research institutes in the study, three are located at two multicommodity centers: BIOTECH and IPB at the University of the Philippines at Los Baños and PRCRTC at

Visayas State College. PHILRICE is a national single-commodity center for rice research. Their specific responsibilities and number of stations are indicated in table 1.

**Table A1. Research Responsibilities and Stations of Four Research Institutes**

Research Institute	Responsibility	Station
Institute of Plant Breeding, IPB (at University of the Philippines at Los Baños)	National, Plant breeding	3
National Institute of Biotechnology and Applied Microbiology, BIOTECH (at University of the Philippines at Los Baños)	National, Biotechnology and Microbiology	1
Philippine Rice Research Institute, PHILRICE (autonomous but reports to Department of Agriculture)	National, Rice	4
Philippine Root Crop Research and Training Center, PRCRTC (at Visayas State College of Agriculture)	National, Root crops (cassava, sweet potato, taro, etc.)	1

In the Philippine research system, a national center conducts basic, fundamental, and applied research on one or more commodities across a broad range of disciplines, as in the case of PHILRICE and PRCRTC. Other national centers, such as BIOTECH and IPB, are very specialized and work only on specific disciplines.

There are two types of national commodity-based centers: multicommodity and single-commodity. The first type, like PRCRTC, works on several commodities and is usually based in an academic institute where there is a broad base of basic disciplines available for basic, fundamental, and applied research. The strictly disciplinary centers, like BIOTECH and IPB, are also based in universities for the same reason.

The second type of center, like PHILRICE for rice, has a specific commodity mandate and conducts a wide range of research from basic to applied and adaptive research on that commodity. Many of these single-commodity centers are autonomous and are quasi-governmental bodies. There are research centers for major commodities like rice, coconuts, cotton, and sugarcane. Usually, these centers also have added responsibilities for technology transfer and training.

The four research centers included in this study were selected on the basis of criteria (discussed in chapter 2), such as location and disciplinary focus. For example, BIOTECH and IPB are in a central location (near a population center). On the other hand, PHILRICE and PRCRTC are located in isolated areas, PRCRTC being on another island. One reason for this choice was to look at the effect of location on the staff profiles of the centers, especially its effect on the choice women make to join the research institutes.

## **BIOTECH**

The National Institute of Biotechnology and Applied Microbiology was established in 1979 as a national research institute but also as an integral part of the University of the Philippines Los Baños (UPLB). It was funded by the government (through UPLB) and the Marcos Foundation, a nonprofit private foundation. BIOTECH aims (1) to provide direction and

support to research in microbiology, genetics, chemistry, and engineering, (2) to train human resources to support the biotechnological and microbiological industries, (3) to extend scientific advice to government and private agencies, (4) to utilize and maintain a microbial control collection unit, and (5) to link research and industry to facilitate commercial applications of laboratory-tested biotechnological processes.

In 14 years, BIOTECH has developed a strong scientific staff to carry out its programs. In 1993 there were 134 staff members, 102 of whom were scientists in the basic life and physical sciences, such as biochemistry, biology, chemistry, food science, genetics, microbiology, agricultural engineering, industrial engineering, chemical engineering, and soil science. Among the scientists, 73% were women. These staff members are distributed across five divisions: agriculture, industry, health, services, and administration.

BIOTECH is located in the Agricultural and Life Sciences Complex on the UPLB campus. It maintains 13 laboratories, such as those for molecular biology, microbial culture collection, central analytical services, vaccines, azospirillum and mycorrhiza, animal feeds, and a pilot plant for the production of ethanol, yeasts, enzymes, and other microbial inoculants.

The main research and development programs of BIOTECH include biofuels, food fermentation and feed production, nitrogen fixation and mycorrhiza, tissue culture, monoclonal-antibody-based diagnosis for rapid indexing of plant diseases, and extension and communication support.

## **IPB**

The Institute of Plant Breeding was established in 1975 as a national research institute based in the College of Agriculture, UPLB. In 1977, the National Plant Genetic Resources Laboratory (NPGRL) was established as part of IPB. Its objectives are (1) to develop new and improved varieties of important dryland crops, (2) to undertake research in plant breeding and allied disciplines, (3) to collect, introduce, preserve, and maintain a germplasm bank of agricultural crops, and (4) to assist other agencies in multiplication of recommended crop varieties.

Like BIOTECH, IPB and NPGRL are located in the Agricultural and Life Sciences Complex on the UPLB campus. The Philippine government, through UPLB, provides funds for the operation of IPB, and its research projects are funded through many external donors. The institute maintains six laboratories (biochemistry, biotechnology, entomology, plant pathology, plant physiology, and genetics), a genebank, and a large research farm at its headquarters to support its plant breeding activities. It also maintains field stations for testing new germplasm in collaboration with several agricultural universities.

Over the years, IPB has developed a large cadre of scientific staff in plant breeding and its support sciences, such as genetics, biochemistry, chemistry, seed technology, and tissue culture. A survey in 1989 showed 63 scientists on its staff. In 1993, there were 127 researchers, 41 of whom were senior scientists. Of this number, 23 were senior scientists seconded from various units of UPLB to conduct research projects on IPB's programs. Sixty-four (50%) of the scientific staff were women.

There are five breeding divisions: cereals (corn, wheat, sorghum); field legumes (mungbeans, peanuts, soybeans, cowpeas); vegetables; fruit, plantation, and ornamental crops; and feed and industrial crops (root crops, forage and pasture, fibers). The NPGRL maintains over 33,000 accessions of 129 plant species and a living collection of 52 plant species.

## **PHILRICE**

The Philippine Rice Research Institute is the youngest of the four institutes in the study. It was established in 1985 as a corporate body attached to the Department of Agriculture. It is an autonomous research institute with its own board of trustees.

PHILRICE was mandated to provide national leadership in rice research in the Philippines. Its objectives are (1) to sustain and expand the gains in rice production in the country, (2) to increase the income of small Filipino rice farmers (3) to expand employment opportunities and stimulate economic growth in rural areas through rice farming, and (4) to promote the general welfare of the people through self-sufficiency in rice production.

Initially, PHILRICE was located on the UPLB campus at Los Baños. In 1989, the center was relocated to Muñoz, Nueva Ecija, at the former Maligaya Research Station of the Department of Agriculture. It has built laboratories, housing, training, and other support facilities at its new headquarters, which are located in a 100-hectare area. PHILRICE is funded by the Philippine government and external donors.

A survey in 1989 showed that there were 103 scientists on the staff. By 1993 this had increased to 129 at its central and experiment stations; 109 of these were researchers with the position of science research specialist or higher. Of the total staff, 53 (41%) were women. The staff members represent a wide range of disciplines in the agricultural sciences, such as agricultural engineering, agronomy, chemistry, entomology, horticulture, plant breeding, plant pathology, social science, and statistics.

PHILRICE maintains three field stations in addition to its central experiment station at Maligaya. These include the Los Baños Experiment Station in Laguna (at the UPLB campus), San Mateo Experiment Station in Isabela, and Midsayap Experiment Station in South Cotabato. It leads a network of collaborating research institutions located all over the country, which implements the National Rice and Development Program. PHILRICE maintains a genebank of traditional and improved varieties of rice in the Philippines.

The research department of PHILRICE is divided into disciplinary divisions such as Plant Breeding, Agronomy and Soils, Crop Protection, and Socio-Economics and Statistics. Its research and development programs are also discipline based and include rice varietal improvement, planting and fertilizer management, integrated pest management, rice-based farming systems, rice engineering and mechanization, social science and policy research, rice chemistry and food science, and technology transfer (on-farm technology development, training, and communication).

## **PRCRTC**

Established in 1975, the Philippine Root Crop Research and Training Center is based at Visayas State College of Agriculture (VISCA) in Baybay, Leyte. Its mandate is to integrate and conduct research and development in all root crops, with the following objectives: (1) to develop high-yielding, good quality, pest-resistant varieties, (2) to develop improved production and harvesting techniques and effective root-crop-based cropping systems, (3) to undertake research in controlling pests and diseases, (4) to study modern processing, postharvest handling, marketing, and utilization techniques for food, feed, and industrial uses, (5) to provide training for farmers, specialists, and extension workers, (6) to disseminate improved varieties and information on new technologies, and (7) to establish linkages with other institutions involved in root crop research.

The PRCRTC is a national center for research and development in cassava, sweet potatoes, taro (gabi), and other root crops. It has an advisory board chaired by the Secretary of Agriculture. The center is divided into discipline-based sections, such as production, varietal improvement, pest management, postharvest technology, product processing and utilization, and engineering and crop processing. These sections are directly linked to the various technical departments of VISCA from which PRCRTC draws expertise for the implementation of its research programs.

In 1989, the core scientific staff of PRCRTC was 28. However, in 1993, the core scientific staff had increased to 54, 21 of whom are senior scientists. In addition, there were 31 senior affiliate scientists from various VISCA technical departments who conducted PRCRTC-supported projects. Of the 85 scientist on the staff, 41 (48%) were women.

The PRCRTC does not have its own field stations. Instead, it leads a national network for root crop research consisting of six university-based research institutions, which represent the major agroecological zones in the country. PRCRTC collaborates with these regional institutions in testing technologies generated by the center. The planning and implementation of the National Root Crop Research and Development Program is spearheaded by PRCRTC. The center also maintains a genebank of all root crop species.



### ANNEX 3: Human Resource Survey Instrument (ARIS)

COUNTRY:	NARS: STATION CENTER: DEPT:
-----	
NAME, FAMILY: DATE OF BIRTH: COUNTRY OF CITIZENSHIP:	GIVEN: MALE / FEMALE: MARITAL STATUS:
-----	
EDUCATION (highest degree): EDUCATIONAL INSTITUTION: MAJOR DISCIPLINE OF STUDY: EDUCATION SPECIALTY: PRIMARY SPONSOR: OTHER SPONSOR:	COUNTRY:    DATE STUDY BEGAN: DATE STUDY ENDED:
-----	
EMPLOYMENT	
PRIOR EMPLOYER? (YES / NO): NAME OF LAST EMPLOYER: CATEGORY OF PREVIOUS EMPLOYER: DATE OF FIRST EMPLOYMENT: FIRST PROFESSIONAL EMPLOYMENT: DATE OF CURRENT EMPLOYMENT: DATE APPOINTED TO CURRENT JOB TITLE: JOB TITLE: GRADE / STEP: DISCIPLINE TITLE: PERMANENT POSITION (YES / NO): NUMBER WEEKS WORKED IN 52-WEEK PERIOD: FULL TIME POSITION (YES / NO): % TIME OF APPOINTMENT: PRIMARY SPECIALIZATION:	
-----	
ANNUAL WORK ACTIVITIES (% Time)	
____: % EMPLOYER'S WORK ACTIVITIES	
____: % NON-EMPLOYER'S WORK ACTIVITIES	
____: % DEGREE STUDY	
____: % NON-DEGREE STUDY	
-----	

EMPLOYER'S ACTIVITIES (% Time)

\_\_\_: % RESEARCH  
 \_\_\_: % SUPPORT SERVICE  
 \_\_\_: % MGT / ADMIN  
 \_\_\_: % CONFERENCES  
 \_\_\_: % TEACHING  
 \_\_\_: % PRODUCTION  
 \_\_\_: % EXTENSION

WORK LOCATIONS (% Time)

\_\_\_: % CENTRAL STATION  
 \_\_\_: % SUB STATION  
 \_\_\_: % ON FARM/FIELD SITE  
 \_\_\_: % SEPARATE ADMIN OFFICE  
 \_\_\_: % TRAVEL

RESEARCH (% Time)

\_\_\_: % BASIC  
 \_\_\_: % STRATEGIC  
 \_\_\_: % APPLIED  
 \_\_\_: % ADAPTIVE

SECTOR (% Time)

\_\_\_: % CROPS  
 \_\_\_: % LIVESTOCK  
 \_\_\_: % FORESTRY  
 \_\_\_: % FISH/WILDLIFE  
 \_\_\_: % NAT RESOURCES  
 \_\_\_: % POLICY/MGT

COMMODITY

%Time CODEA

\_\_\_ \_\_\_  
 \_\_\_ \_\_\_  
 \_\_\_ \_\_\_  
 \_\_\_ \_\_\_  
 \_\_\_ \_\_\_

SUBJECTS

%Time CODEB

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DOCUMENTATION (Number)

DOMESTIC

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FOREIGN

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 \_\_\_  
 \_\_\_

BOOKS & BOOK CHAPTERS  
 JOURNAL ARTICLES  
 RESEARCH REPORTS  
 RESEARCH ABSTRACTS  
 EXTENSION PUBLICATIONS  
 CONFERENCE REPORTS  
 RADIO/TV  
 NEWS ARTICLES  
 OTHER

STAFF SUPERVISION (Number)

\_\_\_ OTHER RESEARCHERS  
 \_\_\_ FIELD TECHNICIANS  
 \_\_\_ LABORATORY TECHNICIANS  
 \_\_\_ LABORERS  
 \_\_\_ CLERICAL



## ANNEX 4: Gender Case Interview Questions

- 1.1.3.1 Are women likely to be in some professions more than others? (checklist)
- 1.1.4.1 Has this situation changed over time? (see 1.1.3.1)
- 1.2.2.1 While in school, what factors led you to select your educational discipline?
- 1.2.2.2 While in school, did you know anyone (any women) in agricultural research? (Yes/No) If yes, how did you know them? How did they influence your education?
- 1.2.3.1 Does your organization have linkages with any primary or secondary schools; if so, what are the purposes, how do they work, and what are the results of these links?
- 1.3.2.1 Has there been a similar/equal application rate for men and women during the last 3 years?
- 1.3.3.1 What factors influenced you to select your organization as an employer?
- 1.3.3.2 Before joining, did you know anyone (any women) in your organization? How did you know or learn of these persons? Did they influence your choice of organization as an employer?
- 1.3.4.1 What factors influence women to join your organization?
- 1.3.5.1 Have there been any special efforts to recruit women or men? (what, when, where, how, who, results)
- 1.3.5.2 Have you learned any lessons about special efforts to recruit women?
- 1.4.2.1 Is your work location in a central or an isolated location?
- 1.4.2.2 Did you choose this location in preference to another location? Why?
- 1.4.2.3 Have you ever been posted to an isolated station during your career? When, for how long?
- 1.4.2.4 Are there advantages and disadvantages (personal, professional, career) of travel assignments or assignment to a field station (isolated location)?
- 1.4.3.1 Does your work require travel to isolated locations (e.g., trial plots, other off-station work)? Explain (how far, how often, etc.)
- 1.4.4.1 Do men and women apply equally for work in central and isolated locations?
- 1.4.4.2 Are you likely to assign equally a man or a women to travel or work in a central or isolated location?
- 1.4.4.3 Are there any regulations regarding women who work in an isolated location?
- 1.5.3.1 Describe your family responsibilities (child care, elderly care, cooking, etc.).
- 1.5.3.2 Have you experienced difficulties or conflict between your family responsibilities and your work or training?
- 1.5.3.3 How have you coped with your work-family conflicts?

- 1.5.3.4 How has your organization helped you cope with your work-family conflicts; are there policies or practices that help employees cope with work-family conflicts?
- 1.5.3.6 Do women scientists or managers have different work-family conflicts from men (personal, general)? (checklist)
- 1.5.3.7 About how many (percent) staff in your organization have experienced conflict between their family responsibilities and their work or training?
- 1.6.1.1 Compare attrition rates and causes of attrition for men and women, married and single.
- 1.6.3.1 Do more men or more women tend to leave the organization? What are the main factors that contribute to attrition; do different factors affect the attrition of men and women?
- 1.6.3.3 Do you know colleagues who have left your organization; were they men or women? What were their reasons for leaving?
- 1.6.3.4 Do similar reasons affect others?
- 1.6.3.5 Does marital status affect retention (attrition)?
- 1.6.3.6 Does the presence of dependents at home affect retention?
- 2.1.3.1 Compare the characteristics and status of disciplines in your organization. Think of five outstanding women scientists in the Philippines; what are their disciplines? (checklist)
- 2.1.4.1 Is your work discipline the same as your educational discipline? (Yes/No) If different, explain your choice of work discipline.
- 2.1.6.1 Does your discipline affect your chances for promotion?
- 2.1.7.1 Is discipline used as a criterion to select managers in your organization?
- 2.2.1.1 Does job mobility hinder, facilitate, or have no affect on promotion?
- 2.2.2.1 What are your own experiences with changing jobs or changing job locations (job mobility) in your career (problems, positive experiences, restrictions, factors that influence your mobility)?
- 2.2.3.1 Do men and women professionals have similar / different experiences with mobility?
- 2.2.4.1 Do single women have the same mobility as single men?
- 2.2.4.2 Do married women have the same mobility as married men?
- 2.2.5.1 Does assignment to a central vs an isolated location affect opportunities for promotion?
- 2.3.2.1 If yes, did these conflicts affect your career; at what career stage?
- 2.5.3.1 How important is the level of your degree vs your years of experience to the advancement of your career?
- 2.5.4.1 Do the criteria for promotion in your organization include degree level as a basis for advancement to senior scientific or management positions?

- 2.5.4.3 Do you work overtime (evenings, weekends); where (home, office), how often, reasons; does overtime affect your career?
- 3.1.1.1 What portion of the male professionals are married; what portion of the female professionals are married?
- 3.1.2.1 In your organization is the spouse of a male professional as likely to have a career as the spouse of a female professional?
- 3.1.3.1 What portion of the professional staff have spouses who have a career?
- 3.1.4.1 Does your spouse have a career? (Yes/No) If yes, describe.
- 3.1.4.2 If yes, has your career affected the career of your spouse?
- 3.1.3.3 If yes, has the career of your spouse affected your career?
- 3.1.5.1 Has recruitment in your organization been affected by spouses with careers?
- 3.1.6.1 Has the assignment of staff to research locations been affected by their dual-career family status?
- 3.1.7.1 Does your organization have policies or practices to deal with dual-career families?
- 3.2.3.1 Do the family responsibilities of women affect the organization? How?
- 3.2.8.1 Have you learned any lessons about dealing with work-family issues?
- 3.3.2.1 Did the organization change its policies in order to affect attrition? What was the process of change? What was the effect of the change?
- 3.3.3.1 Do women who leave for child bearing tend to return? (Yes/No) If yes, how long are their average leaves? ( ) What factors influence their return?
- 3.3.4.1 Does marital status affect careers? (checklist)
- 3.3.5.1 What is the effect of child bearing on training opportunities for women?
- 3.3.6.1 How does pregnancy or raising children affect women's chances for promotion? What policies or practices does your organization have that address these issues?
- 3.3.7.1 Have you learned any lessons about how to deal with attrition of professional women?
- 3.3.7.2 Does pregnancy or raising children affect productivity of scientists or managers; what lessons have you learned about how to deal with these issues?
- 3.4.2.1 In the past, did your organization find any pay differentials between men and women? (Were there any accusations, compensation studies, job analyses, job evaluations, reports?)
- 3.4.3.1 Does the organization have a policy or procedures to reduce or eliminate pay differentials between men and women?
- 3.4.4.1 Do women and men with equal training and experience get equal pay? (checklist)
- 3.4.4.2 Do women and men scientists with equal training and experience in the private sector get equal pay in the country in general?

- 3.4.5.1 Have you learned any lessons about dealing with issues of equal pay for equal work?
- 4.1.0.1 Do you think that men and women researchers have equal opportunities to move into scientific management positions in your organization?
- 4.1.0.2 Are women as interested (desire) as much as men in moving into management positions?
- 4.1.0.3 In general, do male professionals have any difficulties reporting to a female manager?
- 4.1.0.4 Do you think that women professionals are as influential as men in your organization (that their counsel or advice is sought as much)?
- 4.3.0.2 Do you feel that women have to work harder to get the same professional rewards or recognition as men in your organization?
- 4.3.0.3 Do you think that women professionals receive the same level of respect from their colleagues as male professionals?
- 4.4.0.1 Do young women scientists receive the same amount of support and guidance as young men scientists?
- 4.4.0.2 Think of your closest 4 colleagues. How many are male, how many are female? [note % of same sex]
- 4.4.0.3 Do you think that it is easier to work with colleagues who are the same sex as you?

## ANNEX 5: Bachelor's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1990, and by VISCA, 1981-1990

BS UPLB	1972-75			1976-80			1981-85			1986-90		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Agriculture	217	289	506	548	579	1127	477	386	863	250	266	516
Extension related	28	17	45	74	37	111	109	18	127	86	23	109
Food technology			0	63	12	75	119	9	128	95	10	105
Biology	10	3	13	89	65	154	160	106	266	200	103	303
Other science	6	3	9	246	67	313	518	178	696	586	324	910
Economy, management, social science	2	23	25	174	130	304	371	154	525	296	195	491
Engineering, agro-industrial technology	16	53	69	32	201	233	78	182	260	43	108	151
Forestry	37	208	245	197	307	504	329	325	654	257	207	464
Human ecology	87	1	88	119	17	136	147	10	157	129	19	148
Subtotal Ag and related science	403	597	1000	1542	1415	2957	2308	1368	3676	1942	1255	3197
Subtotal other than agriculture	186	308	494	994	836	1830	1831	982	2813	1692	989	2681
Total UPLB	589	905	1494	2536	2251	4787	4139	2350	6489	3634	2244	5878
BS VISCA							1981-85			1986-90		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Agriculture							154	122	276	138	98	236
Extension related							153	45	198	210	67	277
Food technology									0	8	6	14
Biology									0			0
Other science							4	4	8	6	5	11
Economy, management, social science							180	94	274	154	71	225
Engineering, agro-industrial technology							23	56	79	10	23	33
Forestry							20	25	45	16	31	47
Human ecology							38	0	38	122	1	123
Subtotal Ag and related science							572	346	918	664	302	966
Subtotal other than agriculture							418	224	65	526	204	72
Total VISCA							990	570	983	1190	506	1038



## ANNEX 6: Master's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1991

Discipline Type	Discipline	1972			1973			1974			1975		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	Agricultural Engineering			0	1		1	3		3	4		4
	Agronomy	2	1	3	5		5	2		2	3	2	5
	Animal Science	3		3	4		4	6		6	1	2	3
	Forestry			0	1		1	1	3	4	5	1	6
	Horticulture			0			0	3		3	2	1	3
	Plant Breeding			0			0			0			0
	Soil Science			0	5		5	2		2	3	1	4
	Subtotal - Agriculture	5	1	6	16	0	16	17	3	20	18	7	25
Support Science	Agricultural Botany		2	2	2		2	2	2	4	2		2
	Agricultural Chemistry			0		1	1	1	2	3		4	4
	Agrometeorology			0			0			0			0
	Applied Nutrition			0			0			0			0
	Botany			0			0			0		4	4
	Computer Science			0			0			0			0
	Entomology	1	1	2	2	5	7	2	1	3	3	2	5
	Environmental Studies			0			0			0			0
	Food Science and Technology	1	1	2	2	1	3		1	1	3		3
	Genetics			0			0			0		1	1
	Mathematics			0			0			0			0
	Microbiology			0		1	1			0			0
	Parasitology (veterinary med)			0			0			0			0
	Pathology (veterinary med)			0			0			0			0
	Plant Pathology	1		1	1	1	2			0	4	3	7
	Statistics			0	2		2		1	1		1	1
	Wildlife Studies			0			0			0			0
	Zoology			0	1	1	2		2	2			0
	Subtotal - Support Science	3	4	7	10	10	20	5	9	14	12	15	27
Social Science	Agricultural Business Management			0			0			0			0
	Agricultural Economics			0	4	2	6	6		6	3	1	4
	Rural Sociology			0			0			0			0
	Subtotal - Social Science	0	0	0	4	2	6	6	0	6	3	1	4
Extension	Agricultural Education	1	3	4	1	1	2	4		4	3	3	6
	Community Development	2		2			0			0			0
	Development Communications	1		1			0	1		1	2	1	3
	Extension Education	2		2	1	1	2			0			0
	Family Resource Management			0			0			0		1	1
	Subtotal - Extension	6	3	9	2	2	4	5	0	5	5	5	10
TOTAL MASTER'S OF SCIENCE		28	16	44	64	28	92	66	24	90	76	56	132

## ANNEX 6: Master's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1991 (contd.)

Discipline Type	Discipline	1976			1977			1978			1979		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	Agricultural Engineering	3		3	5		5	7	1	8	7		7
	Agronomy	10		10	16	4	20	10	7	17	9	2	11
	Animal Science	8	1	9	6	1	7	8	2	10	5	1	6
	Forestry	7		7	11	1	12	10	3	13	10	1	11
	Horticulture	1	2	3	4	2	6	3	4	7	8	3	11
	Plant Breeding			0			0			0			0
	Soil Science	3	2	5	3	2	5	2	5	7	9	1	10
	<b>Subtotal - Agriculture</b>	<b>32</b>	<b>5</b>	<b>37</b>	<b>45</b>	<b>10</b>	<b>55</b>	<b>40</b>	<b>22</b>	<b>62</b>	<b>48</b>	<b>8</b>	<b>56</b>
Support Science	Agricultural Botany			0	2		2			0			0
	Agricultural Chemistry	1	1	2	1	1	2		1	1	3	4	7
	Agrometeorology			0			0	1		1	9	2	11
	Applied Nutrition	1	4	5	4	1	5		2	2		4	4
	Botany		2	2		3	3	1	1	2	1	2	3
	Computer Science			0			0			0			0
	Entomology		1	1		1	1	4	2	6	4	4	8
	Environmental Studies			0			0			0			0
	Food Science and Technology		1	1		1	1	2	2	4	1	1	2
	Genetics	2		2			0		2	2			0
	Mathematics			0			0			0			0
	Microbiology	1	1	2			0		2	2		1	1
	Parasitology (veterinary med)			0			0			0			0
	Pathology (veterinary med)			0			0			0			0
	Plant Pathology	4		4	6	9	15	8	4	12	5	10	15
	Statistics		1	1	2	1	3	1	6	7	1	1	2
	Wildlife Studies			0			0			0			0
	Zoology			0	5		5	4		4	1	2	3
	<b>Subtotal - Support Science</b>	<b>9</b>	<b>11</b>	<b>20</b>	<b>20</b>	<b>17</b>	<b>37</b>	<b>21</b>	<b>22</b>	<b>43</b>	<b>25</b>	<b>31</b>	<b>56</b>
Social Science	Agricultural Business Management			0			0			0			0
	Agricultural Economics	8	3	11	2	1	3	5	5	10	3	1	4
	Rural Sociology			0		2	2	2	2	4	1	2	3
	<b>Subtotal - Social Science</b>	<b>8</b>	<b>3</b>	<b>11</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>14</b>	<b>4</b>	<b>3</b>	<b>7</b>
Extension	Agricultural Education	3	1	4	3	2	5	4	2	6	4	1	5
	Community Development		1	1	1	2	3	2	3	5			0
	Development Communications	1	2	3	2	3	5	1	4	5	3	9	12
	Extension Education	1		1	1	1	2	2	1	3	5	5	10
	Family Resource Management		2	2		4	4	1	3	4		3	3
	<b>Subtotal - Extension</b>	<b>5</b>	<b>6</b>	<b>11</b>	<b>7</b>	<b>12</b>	<b>19</b>	<b>10</b>	<b>13</b>	<b>23</b>	<b>12</b>	<b>18</b>	<b>30</b>
<b>TOTAL MASTER'S OF SCIENCE</b>		<b>108</b>	<b>50</b>	<b>158</b>	<b>148</b>	<b>84</b>	<b>232</b>	<b>156</b>	<b>128</b>	<b>248</b>	<b>178</b>	<b>120</b>	<b>298</b>



## ANNEX 6: Master's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1991 (contd.)

Discipline Type	Discipline	1980			1981			1982			1983		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	Agricultural Engineering	5		5			0	12	4	16	6		6
	Agronomy	21	16	37	14	7	21	16	9	25	13	10	23
	Animal Science	3	6	9	10	2	12	6	2	8	3	3	6
	Forestry	22	13	35	18	6	24	18	9	27	8	4	12
	Horticulture	8	9	17	6	9	15	5	8	13	6	5	11
	Plant Breeding			0			0	1	1	2			0
	Soil Science	15	7	22	10	8	18	8	9	17	5	1	6
	Subtotal - Agriculture	74	51	125	58	32	90	66	42	108	41	23	64
Support Science	Agricultural Botany			0			0			0			0
	Agricultural Chemistry	1	1	2	1	8	9	2	3	5		3	3
	Agrometeorology	1	1	2	1		1	2	3	5		3	3
	Applied Nutrition		4	4		2	2		2	2		2	2
	Botany			0	4	2	6	1	2	3	1	1	2
	Computer Science			0			0			0			0
	Entomology	4	3	7	8	6	14	2	11	13	2	6	8
	Environmental Studies			0			0			0			0
	Food Science and Technology		1	1	1	4	5		12	12	1	3	4
	Genetics			0	1	1	2	2	3	5			0
	Mathematics	1		1			0			0			0
	Microbiology			0	3	3	6		4	4		2	2
	Parasitology (veterinary med)			0			0			0			0
	Pathology (veterinary med)			0			0			0			0
	Plant Pathology	3	5	8	6	7	13	3	6	9	3	8	11
	Statistics		4	4	4	7	11	4	5	9	1	3	4
	Wildlife Studies			0			0			0			0
	Zoology	2	1	3	1	2	3	2	1	3	2	1	3
	Subtotal - Support Science	12	20	32	30	42	72	18	52	70	10	32	42
Social Science	Agricultural Business Management			0			0			0			0
	Agricultural Economics	3	7	10	4	9	13	3	12	15	5	4	9
	Rural Sociology		6	6		3	3			0	2	3	5
	Subtotal - Social Science	3	13	16	4	12	16	3	12	15	7	7	14
Extension	Agricultural Education	2		2	1		1			0		1	1
	Community Development	3	4	7	1		1	2	3	5		4	4
	Development Communications	5	5	10	3	9	12	1	5	6		3	3
	Extension Education	5	4	9	1	1	2	2	2	4		2	2
	Family Resource Management			0	1		1		2	2			0
	Subtotal - Extension	15	13	28	7	10	17	5	12	17	0	10	10
TOTAL MASTER'S OF SCIENCE		208	194	402	198	192	390	184	236	420	116	144	260

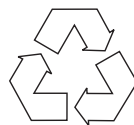
## ANNEX 6: Master's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1991 (contd.)

Discipline Type	Discipline	1984			1985			1986			1987		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	Agricultural Engineering	4	1	5		1	1	8		8	5	1	6
	Agronomy	14	7	21	5	8	13	7	6	13	10	3	13
	Animal Science	6	3	9	3	4	7	6	6	12	5	1	6
	Forestry	12	5	17	8	4	12	3	5	8	5	4	9
	Horticulture	3	6	9	2	5	7	2	5	7		4	4
	Plant Breeding		1	1	2		2	3		3	2		2
	Soil Science	3	11	14	3	5	8	5	5	10	5	4	9
	Subtotal - Agriculture	42	34	76	23	27	50	34	27	61	32	17	49
Support Science	Agricultural Botany			0			0			0		1	1
	Agricultural Chemistry		1	1		2	2	1		1	1		1
	Agrometeorology	1		1	1		1	1		1			0
	Applied Nutrition		4	4		2	2		1	1			0
	Botany		2	2	1	4	5	2	4	6	2	3	5
	Computer Science			0			0			0			0
	Entomology	4	4	8	5	1	6	2	6	8	4	4	8
	Environmental Studies			0			0	1	1	2	1	1	2
	Food Science and Technology	1	8	9		2	2		4	4	2	7	9
	Genetics		2	2	1	2	3	1	1	2		1	1
	Mathematics			0			0			0			0
	Microbiology		2	2		5	5		5	5		2	2
	Parasitology (veterinary med)			0			0			0			0
	Pathology (veterinary med)			0			0			0			0
	Plant Pathology	10	6	16	3	7	10	2	4	6	3		3
	Statistics		1	1	2	1	3	2	5	7	3	1	4
	Wildlife Studies			0			0		1	1			0
	Zoology		2	2		3	3	2	4	6	3	2	5
	Subtotal - Support Science	16	32	48	13	29	42	14	36	50	19	22	41
Social Science	Agricultural Business Management		1	1			0			0			0
	Agricultural Economics	1	5	6	3	3	6	3		3	1	4	5
	Rural Sociology		3	3			0	1		1		3	3
	Subtotal - Social Science	1	9	10	3	3	6	4	0	4	1	7	8
Extension	Agricultural Education		1	1			0			0			0
	Community Development	2	2	4	1		1			0	2		2
	Development Communications	1	2	3	1	4	5	2	7	9		8	8
	Extension Education	1	1	2	2		2	1	2	3	1	1	2
	Family Resource Management		2	2		1	1		1	1		3	3
	Subtotal - Extension	4	8	12	4	5	9	3	10	13	3	12	15
TOTAL MASTER'S OF SCIENCE		126	166	292	86	128	214	110	146	256	110	116	226

## ANNEX 6: Master's Degrees in Agriculture and Related Disciplines Awarded by UPLB, 1972-1991 (contd.)

Discipline Type	Discipline	1988			1989			1990			1991		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	Agricultural Engineering	6		6	6	2	8	1		1	2	2	4
	Agronomy	3	3	6	3	3	6	2	5	7	6	3	9
	Animal Science	7	8	15	4	4	8	4	3	7	3	5	8
	Forestry	5	4	9	3	4	7	4	5	9	11	7	18
	Horticulture		1	1			0	1	4	5	1		1
	Plant Breeding	4	2	6	4	3	7	2	2	4		2	2
	Soil Science	4	2	6	3	5	8	2	2	4			0
	<b>Subtotal - Agriculture</b>	29	20	49	23	21	44	16	21	37	23	19	42
Support Science	Agricultural Botany			0			0			0			0
	Agricultural Chemistry			0			0		2	2	1	1	2
	Agrometeorology			0	1		1		1	1	1		1
	Applied Nutrition		3	3			0		1	1		1	1
	Botany		3	3			0			0	2	2	4
	Computer Science			0			0	1	1	2			0
	Entomology	4	2	6	3	6	9	4	4	8	3	5	8
	Environmental Studies	1	4	5	2		2	4	2	6	1	1	2
	Food Science and Technology	1	7	8		2	2		1	1		4	4
	Genetics		1	1	1	1	2	1	1	2	1		1
	Mathematics			0	1	1	2		2	2		1	1
	Microbiology	1		1			0		2	2	1	1	2
	Parasitology (veterinary med)			0			0			0			0
	Pathology (veterinary med)			0			0			0			0
	Plant Pathology	3	5	8	1	5	6		4	4	1	2	3
	Statistics		1	1		6	6		1	1			0
	Wildlife Studies			0			0			0	1	1	2
	Zoology	3		3			0			0			0
	<b>Subtotal - Support Science</b>	13	26	39	9	21	30	10	22	32	12	19	31
Social Science	Agricultural Business Management			0			0			0			0
	Agricultural Economics		10	10	1	4	5		5	5	3	5	8
	Rural Sociology		1	1		3	3	1	3	4	1		1
	<b>Subtotal - Social Science</b>	0	11	11	1	7	8	1	8	9	4	5	9
Extension	Agricultural Education		1	1			0			0			0
	Community Development			0			0	1		1		1	1
	Development Communications	2	8	10	2	2	4	4	10	14	3	3	6
	Extension Education	2	2	4	3	1	4			0	1	2	3
	Family Resource Management		1	1			0			0		2	2
	<b>Subtotal - Extension</b>	4	12	16	5	3	8	5	10	15	4	8	12
<b>TOTAL MASTER'S OF SCIENCE</b>		92	138	230	76	104	180	64	122	186	86	102	188





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